DOCUMENT RESUME

ED 408 282 SP 037 382

AUTHOR	Peppard, Judy
TITLE	A Guide to Connected Curriculum and Action Research.
INSTITUTION	Wisconsin State Dept. of Public Instruction, Madison.
REPORT NO	ISBN-1-57337-037-1
PUB DATE	97
NOTE	125p.
AVAILABLE FROM	Publication Sales, Wisconsin Department of Public Instruction, Drawer 179, Milwaukee, WI 53293-0179, telephone: 800-243-8782 (Bulletin No. 97177).
PUB TYPE	Guides - Non-Classroom (055)
EDRS PRICE	MF01/PC05 Plus Postage.
DESCRIPTORS	*Action Research; *Curriculum Design; Educational Objectives; Elementary Secondary Education; Faculty Development; *Instructional Improvement; *Integrated Curriculum; *Interdisciplinary Approach; Teacher Improvement
IDENTIFIERS	*Teacher Researchers; *Wisconsin

ABSTRACT

Teachers in the Connecting the Curriculum (CTC) Project utilized action research to study curriculum connections. This guide provides basic information on connected curriculum and action research and explains the processes that underlie them. Chapter 1 introduces connected curriculum, including definitions, frameworks, and multidisciplinary and integrated approaches. Chapter 2 looks at the beliefs that support connected curriculum frameworks, including key beliefs, learning theory, equity, assessment, technology, and systemic reform. Chapter 3 provides examples of using standards and connected frameworks, including an explanation of the Wisconsin learner outcomes. Chapter 4 explores the basics of action research, providing examples. Chapter 5 focuses on reflections by teacher researchers on connected curriculum and action research. Chapter 6 discusses what teachers learned from the CTC Project, based on action researchers' concluding reports. Chapter 7 explores implications for professional development of teachers, lists strategies, and provides the CTC recommendations. Four appendices provide: (1) brief sketches of selected CTC action research projects; (2) Wisconsin's Educational Goals; (3) a list of resources for action research; and (4) a list of resources for connecting curriculum. Many chapters contains references. (ND)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 408 282

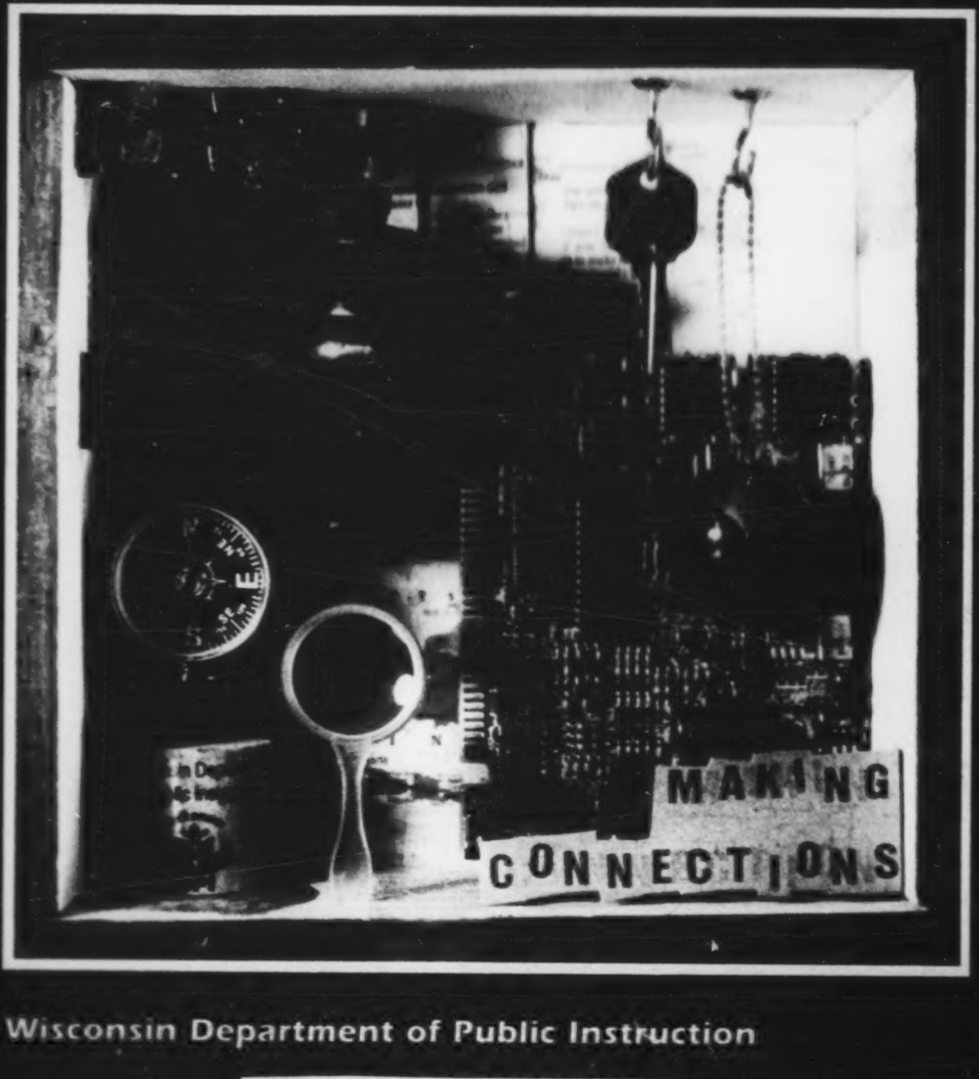
SP

PERMISSION TO REPRODUCE AND
DISSEMINATE THIS MATERIAL
HAS BEEN GRANTED BY
G. Doyle

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)
☐ This document has been reproduced as received from the person or organization originating it
☐ Minor changes have been made to improve reproduction quality
- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

Connected Curriculum and Action Research



Wisconsin Department of Public Instruction

SP037382

BEST COPY AVAILABLE

A Guide to Connected Curriculum and Action Research

Judy Peppard
Director
Connecting the Curriculum Project

Wisconsin Department of Public Instruction
Madison, Wisconsin

This publication is available from:

Publication Sales
Wisconsin Department of Public Instruction
Drawer 179
Milwaukee, WI 53293-0179
(800) 243-8782

Bulletin No. 97177

©1997 Wisconsin Department of Public Instruction

ISBN 1-57337-037-1

The Wisconsin Department of Public Instruction does not discriminate on the basis of sex, race, religion, age, national origin, ancestry, creed, pregnancy, marital or parental status, sexual orientation, or physical, mental, emotional, or learning disability.

Printed on
Recycled Paper

Contents of the Guide

Foreword v
Acknowledgments vii

1 An Introduction to Connecting the Curriculum

Introduction 2
What Are Curriculum Connections? 3
Definitions 4
Connected Curriculum Frameworks 6
Multidisciplinary Approach 7
Integrated Approach 16
How to Create Connections 19
References 25

2 Beliefs Supporting Connected Curriculum Frameworks

Key Beliefs 28
Learning Theory 29
Equity 31
Assessment 33
Technology 34
Systemic Reform 35
References 36

3 Standards and Connected Frameworks

Using Standards 38
Using the Wisconsin Learner Outcomes 42
Content and Standards in a Connected Curriculum 51
References 53

4 Action Research

Introduction 56
How It Works 56
What Action Research Does 61
Examples of Action Research 63
References 70

5 Connected Curriculum and Action Research Stories

Connected Curriculum Frameworks 72
Assessment 76
Equity and Community 79

6 Lessons from CTC

What CTC Taught 86
Connected Curriculum Lessons 86
Action Research Questions 88
Observations and Project Lessons 91
CTC Issues and Answers 92
References 95

7 Implications for Professional Development of Teachers

Introduction 98
Professional Development in Wisconsin 98
Strategies for Professional Development 100
CTC Recommendations 101
References 103

8 Appendixes

A. Selected CTC Action Research Projects 106
B. Wisconsin's Educational Goals 113
C. Resources for Action Research 115
D. Resources for Connecting Curriculum 117

Foreword

The goal of all educators is to improve teaching and learning in our schools. This guide deals with two important tools that can further this objective—connecting the curriculum and teacher action research.

Teachers in the Connecting the Curriculum (CTC) Project created learning opportunities that made it possible for students to see how the subjects they were studying could be integrated to give students a better understanding of everything they were learning. An underlying premise of connected curriculum is that the whole is greater than the sum of its parts. When students are able to integrate the knowledge and skills they learn in all of their subjects, their understanding becomes deeper and more comprehensive. Connected learning can also help students understand that what they learn in school will have practical value to them in their lives outside of the classroom today and in the future.

The CTC project utilized action research to study curriculum connections. Thus, while teachers were creating connections for their students, teachers were also learning how to conduct their own research into issues such as how connected curriculums affected student learning.

This research not only helped teachers learn about making curriculum connections, but it helped them learn how to improve their own practice as teachers. This guide explains how educators can use curriculum connections and action research to improve teaching and learning throughout our schools.

John T. Benson
State Superintendent

Acknowledgments

A Guide to Connected Curriculum and Action Research was developed with the generous assistance of many individuals and organizations. Among those deserving of thanks are the following:

Contributing Authors

Barbara Brodhagen
Teacher
Sherman Middle School
Madison, WI

Marguerite Sneed
Professor
Alverno College
Milwaukee, WI

Connecting the Curriculum Leadership Group

Barbara Brodhagen
Teacher
Sherman Middle School
Madison, WI

James Beane
Professor
National-Louis University
Evanston, IL

William Dunlap
Professor
UW-Eau Claire
Eau Claire, WI

Nick Dussault
Director of Assessment
Sheboygan Area Schools
Sheboygan, WI

Mary Ann Evans-Patrick
Professor
UW-Oshkosh
Oshkosh, WI

Laurie Hittman
Director, Instructional Services
Eau Claire Area Schools
Eau Claire, WI

Pat Neudecker
Assistant Principal
North Star Middle School
Eau Claire, WI

John Price
Director of Curriculum
Appleton Area Schools
Appleton, WI

Marguerite Sneed
Professor
Alverno College
Milwaukee, WI

Cheryl Star
Professor
UW-Eau Claire
Eau Claire, WI

Ronald Szymanski
Language Arts Superviosr
Milwaukee Public Schools
Milwaukee, WI

Ken Zeichner
Professor
UW-Madison
Madison, WI

Department of Public Instruction Staff Contributors

Robert DeMuth
Teacher Education and Placement

John Fortier
Accountability

Susan Grady
Content and Learning

Jacque Karbon
Reading/Language Arts

Ellen Last
Challenging Content Standards

Kathryn Lind
Teacher Education and Placement

Cyntha Pattison
Frameworks in Science and Math

Melvin Pontious
Music

Martin Rayala
Art

Paul Sandrock
Foreign Language

Richard Sorensen
Library Literacy

Sharon Strom
Family and Consumer Education

Karen Prickette
Social Studies

Madeline Uraneck
International Education

In addition, the following persons served on the DPI CTC Steering Committee:
Mary Jane Best-Louther, School to Work
Chet Bradley, Health Education
Rosemary Fitton, Math
Harriet Forman, Program Improvement
Kay Ihlenfeldt, Library Services
Mary Kleusch, Alcohol and Other Drug Abuse and Student Wellness
Kathleen Lindas, Teacher Licensing
Addie Pettaway, Equity and Multicultural Education
Connie Salveson, Goals 2000
Preston Smeltzer, Special Needs

Appreciation is extended to the CTC Leadership Group who provided key direction and support throughout the project. Special thanks to Dr. Ellen Last who provided leadership in planning and in obtaining federal funds and developing the initial plans for Connecting the Curriculum, Dr. Gordon Vars for his leadership in charting a new course for working with teachers and schools, Dr. Nick Dussault who served as the evaluator for the project, Kay Ihlenfeldt, for her assistance in providing and coordinating vital information and to Rebecca Oosterwyck and Jana Price, CTC project assistants, who touched on and influenced all aspects of program activities.

The contributions of the steering team, regional task forces, and advisory council are gratefully acknowledged. Task force members include:

Michael W. Bergen
Carol Bitar
Barbara Brodhagen
Durelle Chopp
Carmen Coballes-Vega
Donna Coomer
John Daly
Kay Davis
John Deering
Stuart Dodge

William Dunlap
Patricia Enciso
Mary Ann Evans-Patrick
Ronald Fandry
Diane Fjelstad
Michelle Froehlke
Sue Fulkerson
Darlene Glass
John Grafenauer
Mary Hickey
Laurie Hittman
Donna Hodges
Karen Horan
Mary Jett-Simpson
Deb Larson
John Lehman
Pamela Lucas
Jeff Maas
Stephanie Malaney
Amy McClellan
Michael McElwee
Scott Miller
John Molis
Tom Morrissey
Patricia Neudecker
Terri Newman
Joseph Papenfuss
Carolyn Parker
Robert Pavlik
Robert Peacy
Michael Pekarske
John Price
Cheryl Starr
William Stotts
Ernestine Tesdell-Lawrence
Linda Tiezzi
Joe Wilson
Leslie Youngsteadt
Ken Zeichner

Of special significance is the work of more than 300 educators who conducted action research in their classrooms during the three-year course of the project. Some of their project descriptions are included in the appendix.

Division for Libraries and Community Learning

Publications Team

Brian Lavendel, Editor
Brian Satrom, Editor
Mike Uschan, Editor
Kathy Addie, Formatter and Graphic Artist
Karen Faster, Proofreader
Victoria Horn, Graphic Artist

Thanks are also due to Greg Doyle, Director of Communications, for support and coordination.

The CTC Project was funded by the Federal Grant Program, The Secretary's Fund for Innovation in Education-Innovation in Education Program, U.S. Department of Education.

In-kind contributions were made by staff from the Wisconsin DPI, Cooperative Educational Service Agencies, local school districts, and institutions of higher education.

Views expressed in this program do not necessarily reflect positions of sponsoring agencies.

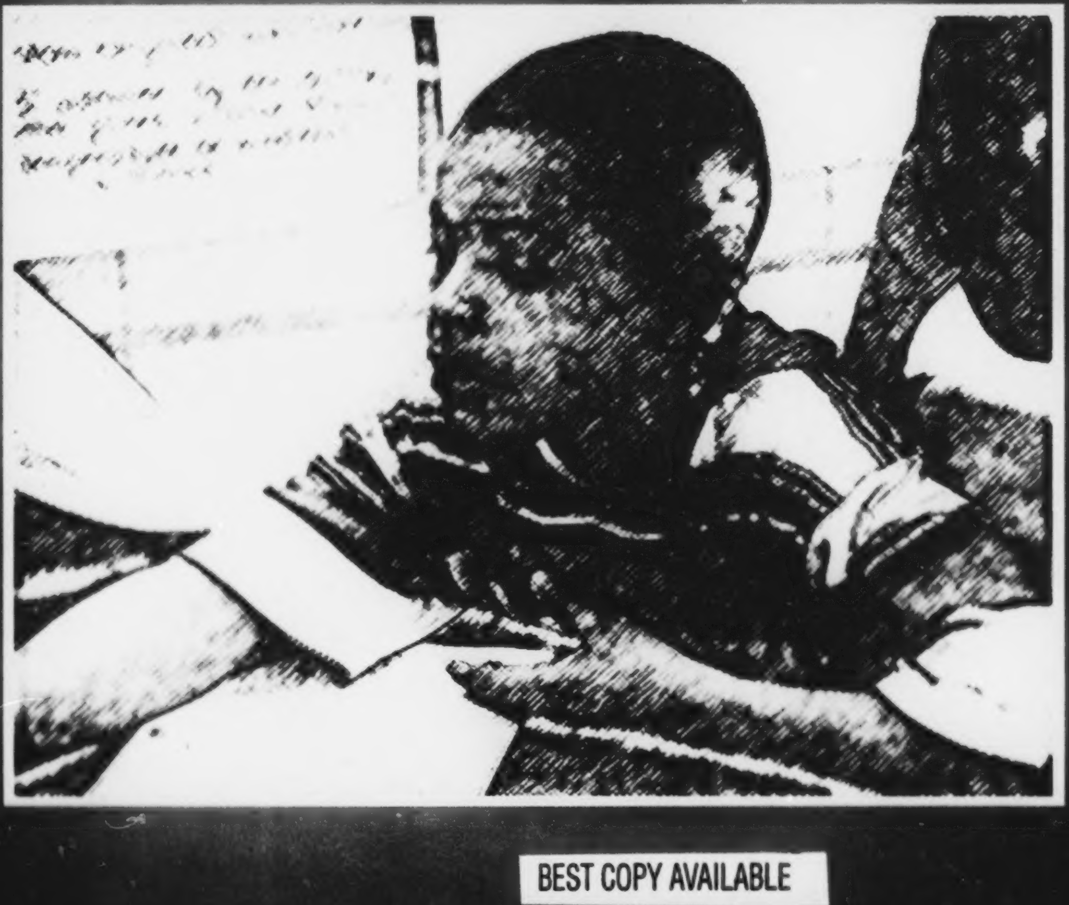
Copyrighted Materials

Every effort has been made to ascertain proper ownership of copyrighted materials, to credit original authors, and to obtain permission for use where necessary. Any omission is unintentional.

1

An Introduction to Connecting the Curriculum

Introduction
What are Curriculum Connections?
Rationale
Connected Curriculum Approaches
Multidisciplinary Approach
Integrated Approach
How to Create Connections
References



BEST COPY AVAILABLE

Introduction

This guide grew out of the Connecting the Curriculum (CTC) Project, a three-year, federally funded educational reform initiative administered through the Wisconsin Department of Public Instruction (DPI). CTC has helped teachers throughout Wisconsin learn the value of connected learning and teacher action research.

In the CTC Project, connected learning and teacher action research were woven together. CTC was designed to help teachers realize the potential that connected curriculum holds for creating quality learning experiences for all students. Action research was the professional development tool to help teachers learn to create such curriculum and to study their classroom practices. This curriculum guide addresses both how to create connected curriculum and how to conduct action research.

Connected curriculum is a powerful tool in aiding teaching and learning because students learn more when they can see connections in what they are studying. In the separate subject approach, students tend to view learning as compartmentalized; they may feel that the knowledge or skills they acquire in one class have no relation to what they learn in their other classes. The truth, however, is that all knowledge is connected, in one way or another. For people to realize their full potential, they need to be able to make those connections in their daily lives, whether they are in school or not.

As adults, people must utilize a wide array of knowledge and skills every day. Workers need to be able to read plans, blueprints, or other documents, make mathematical calculations, and use various skills in a variety of ways. Each and every day, whether at work or elsewhere, adults must combine all the knowledge and skills they have acquired in order to lead successful lives. The connected curriculum approach helps students understand how to do make these connections and to realize how important such a skill is. Connected curriculum enables students to see connections in what they are learning, helps them realize its value, and combines to give them a more complete understanding of their world and how it works. It makes learning make sense to them in a way the separate-subject approach never can.

Action research is a process many education professionals use to systematically investigate the way they perform their jobs, with the ultimate goal of improving student achievement. In action research, teachers define a research question based on issues or problems that concern them, develop a plan to study it, and then collect data as the action research unfolds. Teachers use the data they collect to examine their underlying personal assumptions about how they teach and finally make any changes that are warranted.

This guide will provide basic information on connected curriculum and action research and will explain the processes that underlie them. But perhaps the most revealing portions of this guide are those sections in which teachers explain, in their own words, what it was like to create curriculum connections and to investigate their practice.

What Are Curriculum Connections?

The goal of connecting curriculum is the same children have when they draw lines between what, at first glance, appear to be unrelated dots of a dot-to-dot puzzle. As children link more and more of the dots, a form gradually begins to emerge from the seemingly unrelated collection of dots. Curriculum connections enable students to see how the knowledge and skills they gain in various disciplines can unite to give them a better, more comprehensive understanding of their world and how it works.

Connected curriculums often rely on organizing centers (also called themes, topics, or units) as a way to meld disciplines. For example, a third-grade class might choose transportation as the organizing center to link subjects. Students could read and conduct other research into the various modes of moving people and goods. They could investigate how these forms of transportation developed, as well as the changing conditions and new trends affecting transportation today. This might entail studying the history of transportation, including how various forms of transportation have shaped their own community. Students could develop math skills by gathering information and calculating which forms of transportation are fastest, most expensive, and so forth. In assignments similar to those they might normally have in an English class, students could hone their writing and speech skills through papers and oral presentations on subjects related to transportation. The different technologies involved in transportation might trigger studies in science. Music and art classes also could be incorporated into this theme; students might learn and perform songs that deal with transportation, or they could create illustrations, posters, or collages.

This example shows how students in a connected curriculum can still be exposed to all academic disciplines and learn the same kinds of skills and knowledge as in separate-subject classes while gaining new understanding as to how everything they learn fits together. This helps them make sense of what they learn in a way that is next to impossible when subjects are studied separately.

Students sometimes do not understand why they have to learn a particular mathematical calculation or to understand history, English, or geography. They may believe that this knowledge or skill is unlikely to be of use to them in the future, or that they are being forced to learn the information for no reason. But when students begin making curriculum connections, they realize that what they are learning can be useful and relevant to them beyond a particular class; they realize that the knowledge can help them succeed in other areas of their lives. Students will realize they are not picking up isolated facts and random expertise just to pass tests. In short, the connected curriculum brings a sense of relevance and purpose to the educational process.

...the connected curriculum brings a sense of relevance and purpose to the educational process.

Just as important, curriculum connections teach students to mesh knowledge and skills in order to accomplish meaningful tasks. In the world of work, people need to utilize many skills every day to perform their jobs. Whether someone is running a corporation or operating a machine in a factory, she or he will integrate many types of knowledge and a variety of skills to accomplish tasks. Thus, connected curriculums help prepare students for their post-school experiences in the world of work, and life in general, by teaching them how to apply their knowledge and skills to perform a job, solve a problem, or make a decision.

The basic goal of connecting the curriculum is to improve teaching and learning by emphasizing connections between academic disciplines. However, students cannot begin to learn in this new way unless their teachers learn new ways to teach. Educators must look at the way they do their jobs; adopt new attitudes about their relationships with students, colleagues, parents, and the community; and find new approaches to help students learn more effectively.

Definitions

The following definitions are offered as a common language for people involved in curriculum connections and action research.

Action Research (sometimes referred to as teacher action research, teacher-led inquiry, or classroom-based research) is the process by which educators use research techniques to investigate their teaching practices. They develop a research question based on problems of immediate concern and then use the data to examine underlying personal assumptions about how they teach. As part of the overall goal of making improvements in the learning organization and its performance, this research is often shared with students, colleagues, and other members of the educational community. In action research, educators assume responsibility for their own professional growth as they pursue their ultimate goal of improved student achievement.

Applied Learning refers to learning experiences that give students the opportunity to apply knowledge and skills through authentic tasks that students need or want to do.

Connected Curriculum involves making connections between experiences in school and out of school or between planned learning experiences and previous learning, or simply moving beyond the fragmented, separate subject or skill approach. Two major approaches to designing connected curriculum are the multidisciplinary and the integrated approaches. The multidisciplinary model maintains distinctions between individual subjects while the integrated model does not.

Multidisciplinary approaches are based on an organizing center, such as a theme, topic, or problem. The organizing center allows connections between and among knowledge and skills drawn from various subjects. In a multidisciplinary framework, the separate subjects retain their identity and, typically, have separate time slots in the school schedule. Multidisciplinary organization is also referred to as curriculum correlation, subject fusion, and the broad-fields approach.

Integrated curriculum approaches do not maintain the identities of separate subjects. Instead, educational activities organically integrate knowledge and skills from many subjects. Content and skills are taught, learned, and applied as the need arises in studying particular themes. Integrated curriculums are also referred to as transdisciplinary, problem-centered core, and unstructured core.

With its emphasis on themes, contextual application of knowledge, and constructivist learning, an integrated curriculum approach is particularly well-suited to enabling students to integrate what they are learning into their active base of knowledge.

Connected Curriculum Framework organizes an instructional lesson, unit, or program. It helps students make connections between what is known and not known between subjects and between student experiences in school and those outside of school. A connected framework links curriculum, instruction, and assessment as integral parts of the whole learning experience.

Constructivist theory is a theory of knowledge in which students construct personal meaning by relating new information and concepts to past experience. It also refers to the process of teaching and learning through which learners assemble an ever-growing body of knowledge.

Curriculum Theme is an organizing center for learning experiences and activities that occur over a period of time. Themes may be drawn from those within an existing curriculum, from major social problems or issues, from the concerns of students, or from any topic that appeals to students. The theme gives students a sense of coherence and context for a learning experience that might otherwise be fragmented or abstract. In addition, certain types of themes, especially those regarding social problems, are meant to involve students in an awareness of issues and in the democratic application of knowledge (see Organizing Center).

Fused Courses combine two or more subjects (for example, history and English) into a new course.

Learner-Centered Teaching and Learning focuses on the student and how he or she can best learn. Connected learning experiences tend to be learner-centered. A learner-centered classroom intertwines teaching and learning, incorporates development of multiple intelligences, actively engages students in learning that they have helped design, involves higher-order thinking skills, and draws on multiple learning resources within and without the school. It reflects much of the current theory about learning, including implications of how the brain functions.

Learner Goals are expectations for students expressed in broad terms. They may be formulated by schools, state and national educational agencies, or other groups associated with education. The Wisconsin Learner Goals are listed in the appendix.

Learner Outcomes are statements that identify what students should know and be able to do as a result of their educational experience. They express ways in which students should be able to apply knowledge and skills. Wisconsin's learner outcomes are listed in figure 16.

Organizing Center is a generic term for any title, topic, concept, issue, or problem that is used as a unifying focus in any type of curriculum design (see curriculum theme).

Pedagogy is the art, science, or profession of teaching.

Professional Development is an ongoing, systematic growth process for all individuals involved in education. It improves teaching and learning for the benefit of all students. Professional development promotes the achievement of organizational goals through the application and maintenance of knowledge, skills, and practices. The group of individuals who can gain from professional development encompasses not only teachers, but school board members, professional staff, cooks, bus drivers, parent volunteers, citizen committee members, and others who have a stake in the success of schools.

Project is a term referring to a substantial student activity that addresses a theme, topic, problem, issue, or question. Projects are usually part of a learning experience requiring several weeks or more. They are intended to integrate knowledge from a variety of sources, and to culminate in a product or performance.

Standards in education are generally defined as content standards, performance standards, and proficiency standards. Content standards need to be specific so that they can become the basis for creating performance and proficiency standards.

Content Standards are detailed statements of important facts and concepts students should learn and skills they should acquire. It is important to note that students must understand how to apply the knowledge and skills they have learned.

Performance Standards are statements of what a student must be able to do to show he or she has met a content standard.

Proficiency Standards describe various levels of achievement or performance. Such standards should include the criteria used to assess student work as well as examples of student work that demonstrates various levels of performance

Connected Curriculum Frameworks

Much of today's work in education strives to help students make connections between and among subjects they once studied separately. In Wisconsin, school districts are required by law to develop and maintain written, sequential curriculum plans in twelve subject areas. However, local school boards determine curriculum content as well as the curriculum materials used. In 1985 the DPI began publishing curriculum planning guides in all content areas. Although these guides sometimes address curriculum connections, their primary aim is to provide information on how to teach discrete subjects. This guide focuses on making connections between subjects.

Educators throughout Wisconsin have applied and refined the connected frameworks discussed in this guide through action research in their own classrooms. Teachers have learned to use these curriculum frameworks as bridges between subjects and classroom practices. These frameworks provide a means to organize and evaluate the content and processes of instructional units, themes, topics, and activities.

A connected curriculum framework organizes an instructional program to help students make connections between what is known and not known, between and among different areas of the curriculum, and between what students learn in school and what they experience outside of school. Frameworks can guide the development of connected units or lesson plans. In a connected framework, curriculum, instruction, and assessment are linked together as integrated parts of the learning experience. Two main types of connected curriculum frameworks, multidisciplinary and integrated, are used in this guide to transform a separate discipline or subject approach to teaching.

Multidisciplinary Approach

A multidisciplinary framework retains the individual identities of subjects but creates connections between them. Students view an organizing center through the lense of the subjects encompassed. In a multidisciplinary framework, students employ the knowledge and skills they learn in one discipline to all disciplines.

In a multidisciplinary curriculum, the whole is greater than the sum of its parts.

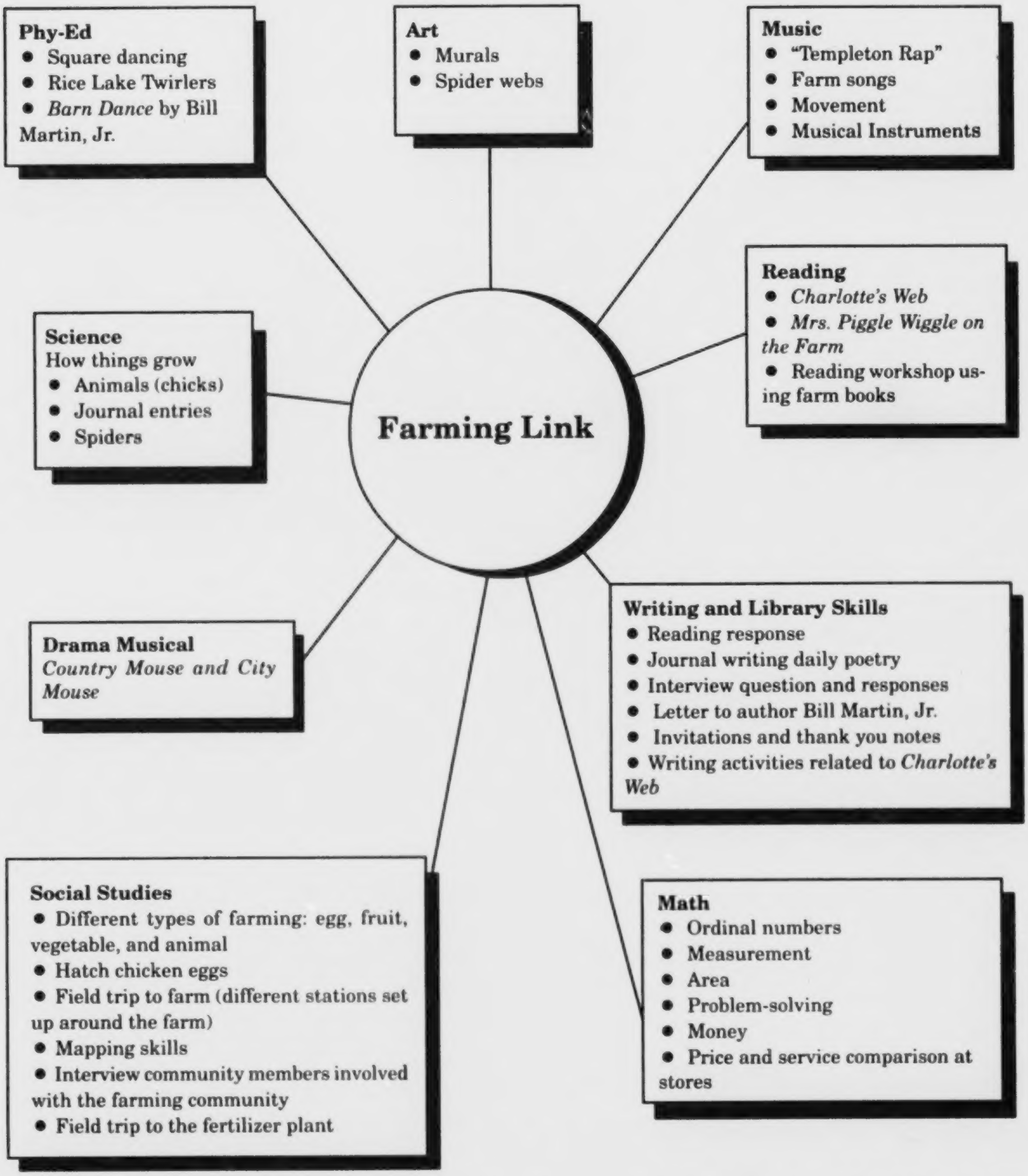
In a multidisciplinary curriculum, the whole is greater than the sum of its parts because students making connections between separate subjects learn more about the subject under study. When, for example, teachers of science, mathematics, and English collaborate, the multidisciplinary curriculum they create will enable students to use all their knowledge and skills to do their work. Students might apply knowledge of the metric system, which they learn in mathematics, to perform lab experiments or other assignments for science. The English teacher might ask students to learn writing skills for producing technical reports for science or explaining mathematical concepts.

Figure 1 illustrates a multidisciplinary curriculum framework used by third grade students in a CTC project at Tainter Elementary School in the Rice Lake School District. It shows how teachers enable students to apply the knowledge and skills they learn in a number of subjects. Teachers Dianne Barkley, Ava Schwartz, and Kim Timmers linked subjects with the theme of the farming community, intertwining the study of individual subjects to give students a broader learning experience than the separate subject approach.

In recent years, connected curriculum has gained acceptance as a powerful tool in reforming education and improving the quality of teaching and learning. Following is a sampling of thoughts on curriculum connections using the multidisciplinary model from a few of the leading thinkers and practitioners on connecting the curriculum. For further study in this area, see the appendix, which lists reference works on curriculum connections.

Figure 1

The Farming Link



Farming Link

Phy-Ed
- Square dancing
- Rice Lake Twirlers
- *Barn Dance* by Bill Martin, Jr.

Art
- Murals
- Spider webs

Music
- "Templeton Rap"
- Farm songs
- Movement
- Musical Instruments

Reading
- *Charlotte's Web*
- *Mrs. Piggle Wiggle on the Farm*
- Reading workshop using farm books

Science
How things grow
- Animals (chicks)
- Journal entries
- Spiders

Drama Musical
Country Mouse and City Mouse

Writing and Library Skills
- Reading response
- Journal writing daily poetry
- Interview question and responses
- Letter to author Bill Martin, Jr.
- Invitations and thank you notes
- Writing activities related to *Charlotte's Web*

Social Studies
- Different types of farming: egg, fruit, vegetable, and animal
- Hatch chicken eggs
- Field trip to farm (different stations set up around the farm)
- Mapping skills
- Interview community members involved with the farming community
- Field trip to the fertilizer plant

Math
- Ordinal numbers
- Measurement
- Area
- Problem-solving
- Money
- Price and service comparison at stores

Adapted from Dianne Barkley, Ara Schwartz, Kim Timmers, Tainter Elementary School, Rice Lake, Wisconsin.

Robin Fogarty

Robin Fogarty is an educational consultant working on creating curriculum connections. In "Ten Ways to Integrate Curriculum," Fogarty details strategies to design curriculums that will enable students to make learning connections (1991). CTC teachers frequently adopted three of the multidisciplinary approaches mentioned in figure 2—shared, webbed, and sequenced.

Figure 2 ■

Toward an Integrated Curriculum

Ten Approaches for Integrating the Curricula: How Do You See It?

Fragmented
Periscope—one direction; one sighting; narrow focus on single discipline

Description	Example
The traditional model of separate and distinct disciplines, which fragments the subject areas.	Teacher applies this view in math, science, social studies, language arts or sciences, humanities, fine and practical arts.

Shared
Binoculars—two disciplines that share overlapping concepts and skills

Description	Example
Shared planning and teaching take place in two disciplines in which overlapping concepts or ideas emerge as organizing elements.	Science and math teachers use data collection, charting, and graphing as shared concepts that can be team-taught.

Nested
3-D glasses—multiple dimensions to one scene, topic, or unit

Description	Example
Within each subject area, the teacher targets multiple skills: a social skill, a thinking skill, and a content-specific skill.	Teacher designs the unit on photosynthesis to simultaneously target consensus seeking (social skill), sequencing (thinking skill), and plant life cycle (science content).

Webbed
Telescope—broad view of an entire constellation as one theme, webbed to the various elements

Description	Example
A fertile theme is webbed to curriculum contents and disciplines; subjects use the theme to sift out appropriate concepts, topics, and ideas.	Teacher presents a simple topical theme, such as the circus, and webs it to the subject areas. A conceptual theme, such as conflict, can be webbed for more depth in the theme approach

Connected
Opera glass—details of one discipline; focus on subtleties and interconnections

Description	Example
Within each subject area, course content is connected topic to topic, concept to concept, one year's work to the next, and relates idea(s) explicitly.	Teacher relates the concept of fractions to decimals, which in turn relates to money, grades, and so forth.

Sequenced
Eye glasses—varied internal content framed by broad, related concepts

Description	Example
Topics or units of study are rearranged and sequenced to coincide with one another. Similar ideas are taught in concert while remaining separate subjects.	English teacher presents an historical novel depicting a particular period while the history teacher teaches the same historical period.

Threaded
Magnifying glass—big ideas that magnify all content through a metacurricular approach

Description	Example
The metacurricular approach threads thinking skills, social skills, multiple intelligences, technology, and study skills through the various disciplines.	Teaching staff targets prediction in reading, math, and science lab experiments while social studies teacher targets forecasting current events and thus threads the skill (prediction) across disciplines.

Integrated
Kaleidoscope—new patterns and designs that use the basic elements of each discipline

Description	Example
This interdisciplinary approach matches subjects for overlaps in topics and concepts with some team teaching in an authentic integrated model.	In math, science, social studies, fine arts, language arts, and practical arts, teachers look for patterning models and approach content through these patterns.

Immersed
Microscope—intensely personal view that allows microscopic explanation as all content is filtered through lens of interest and expertise

Description	Example
The discipline becomes part of the learner's lens of expertise; the learner filters all content through this lens and becomes immersed in his or her own experience.	Student or doctoral candidate has an area of expert interest and sees all learning through that lens.

Networked
Prism—a view that creates multiple dimensions and directions of focus

Description	Example
Learner filters all learning through the expert's eye and makes internal connections that lead to external networks of experts in related fields.	Architect, while adapting the CAD/CAM technology for design, networks with technical programmers and expands his/her knowledge base, just as architects traditionally did with interior designers.

Extrapolated from "Design Options or an Integrated Curriculum" by Heidi Hayes Jacobs in *Interdisciplinary Curriculum*, ASCD, 1989.

In the sequenced view, topics or units are taught in separate classes or subjects, while the topics or units are rearranged to provide connections. The classes, while remaining separate, teach corresponding material. The following examples of how this can be done are taken from Fogarty's book:

- Students can study the children's novel *Charlotte's Web* at the same they learn about real spiders in science.
- Students can read the story *Johnny Tremain* as a supplement to a history unit about the American Revolution.
- Students who learn how to make graphs in mathematics can transfer that skill to science, where they could use graphs to analyze weather data.

In the shared view, teachers of two different subjects review their courses to see where concepts or topics common to both disciplines overlap. They can then work as a team to teach an area of knowledge or a skill common to both subjects. Whereas in the sequenced view, no topics or units are changed, in the shared view, teachers adapt or modify their content in a topic or unit, reinforcing or extending what is being taught in another subject area. If a history teacher uses "The American Dream" as the organizing center for a unit on American history, an English teacher can adopt the same theme for a short story assignment. The teachers, working together, help students understand connections created by the central theme.

The webbed model uses an organizing center to connect any number of disciplines or subjects. When a common theme is adopted, each teacher uses it to organize and teach knowledge and skills specific to their individual subjects. If the organizing center was a general topic such as "inventions," students in science could study machines to investigate scientific theories and knowledge; students in language arts class could read and write about inventors; and technology education students could design and build models of various machines. Students in art classes could draw machines or inventions, or even the whimsical, fantasy contraptions created by Rube Goldberg.

Heidi Hayes Jacobs

Heidi Hayes Jacobs' book serves as a guide for teachers to design and implement connected curriculum. Jacobs offers the following steps for designing a multidisciplinary approach: first selecting an organizing center; second brainstorming associations; third establishing guiding questions to serve as a scope and sequence for the content; and fourth writing activities for implementation (Jacobs, 1989).

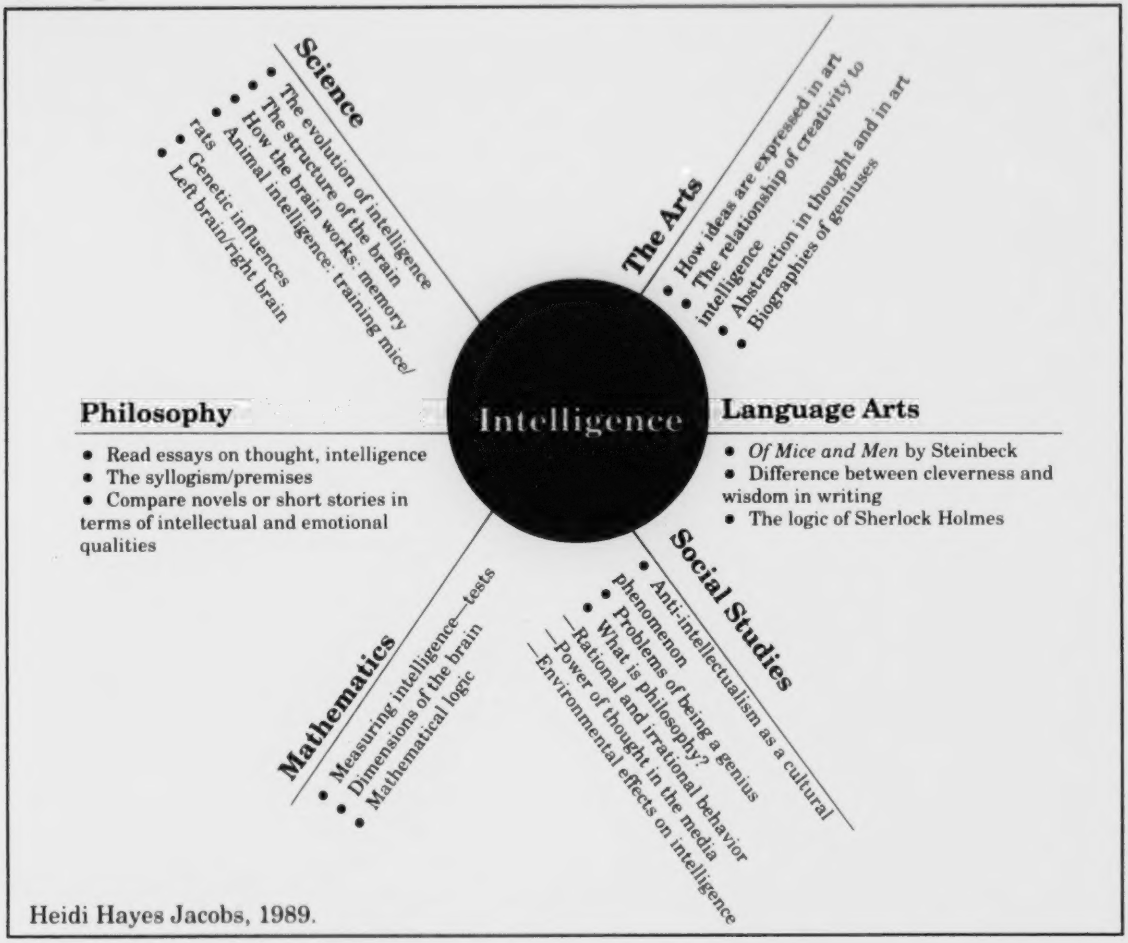
The first step entails that teachers select a theme, subject area, event, issue, or problem as an organizing center. The center should not be so general that it is without boundaries nor so narrow that it becomes restrictive. The best topics are those that cross subject lines and are relevant to students. Sometimes, themes may be suggested by students.

After choosing a topic, teachers and students brainstorm associations by asking questions and talking about people and ideas related to the organizing theme. The teacher records these associations under specific disciplines. Figure 3 shows this process applied to the theme of intelligence. Jacobs believes this model's advantage is that students themselves have the opportunity to consider the organizing centers from the viewpoint of each discipline.

In the next step, guiding questions are used to arrange the brainstormed ideas into a scope and instructional sequence. As an example, Jacobs cites the questions that a team of teachers developed for a unit on flight: "What flies? How and why do things in nature fly? What has been the impact of flight on human beings? What is the future of flight?" Guiding questions are cross-disciplinary in nature, form the scope and sequence of the unit, and are used to create a logical order. This ordering is necessary, Jacobs believes, to prevent haphazard instruction and to provide a framework to investigate the organizing center.

In the final step, instructional activities are devised and written to address the guiding questions. As teachers create learning activities, Jacobs suggests they employ various forms of instruction (writing, speaking, debating, and so forth), and grouping patterns (dyads, triads, large groups, teams, and individual work). She also recommends use of Bloom's taxonomy, a system to analyze the complexity of learning (see figure 4), or similar tools to chart a variety of learning processes and levels of thinking.

Figure 3


Science
• The evolution of intelligence
• The structure of the brain
• How the brain works: memory
• Animal intelligence: training mice/ rats
• Genetic influences
• Left brain/right brain
The Arts
• How ideas are expressed in art
• The relationship of creativity to intelligence
• Abstraction in thought and in art
• Biographies of geniuses
Intelligence
Philosophy
• Read essays on thought, intelligence
• The syllogism/premises
• Compare novels or short stories in terms of intellectual and emotional qualities
Language Arts
• *Of Mice and Men* by Steinbeck
• Difference between cleverness and wisdom in writing
• The logic of Sherlock Holmes
Mathematics
• Measuring intelligence—tests
• Dimensions of the brain
• Mathematical logic
Social Studies
• Anti-intellectualism as a cultural phenomenon
• Problems of being a genius
• What is philosophy?
—Rational and irrational behavior
—Power of thought in the media
—Environmental effects on intelligence

Heidi Hayes Jacobs, 1989.

Marian Martinello and Gillian Cook

Interdisciplinary Inquiry in Teaching and Learning, by Marian Martinello and Gillian Cook, is a three-part examination of paradigms of teaching and learning. The first section begins with a discussion of the qualities of inquiry common to different disciplines (see figure 5) and includes the historical context of connected curricula in education (Martinello and Cook, 1994). The second part deals with the development of interdisciplinary theme studies, including models and specific examples teachers can use in an inquiry model. The authors suggest the following guidelines for designing theme studies:

- Select a theme.
- Develop a web or other tool to build a wealth of ideas.
- Identify questions through the lenses of different disciplines.
- Identify concepts and formulate generalizations with the theme.
- Meet local curriculum requirements or frameworks.
- Map the general sequence.

Figure 4

Processes Using Bloom's Taxonomy

Unit: Flight	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
1. How do things in nature fly?	Identify bird's flight patterns	Recall principles of bird flight	Chart the movements of bird flight	Compare to man-made flying machines		
2. How and why do people fly?	List principles of aerodynamics	Translate these principles to: • balloon • jet • hang-glider	Illustrate the principles as they apply to space flight	What are the historical reasons for change in flying preferences? Write in essay form	Create a new flying machine in blueprint	Appraise the machine's effectiveness
		Read the biographies of Lindbergh and Earhart	List modern-day counterparts to these fliers	Compare similarities and differences between past and modern flight heroes	Write a biography of a fictional hero of the future	

Heidi Hayes Jacobs, 1989.

- Formulate questions for study inquiry.
- Develop ideas for learning-activity clusters.
- Identify content and process objectives.
- Design learning activities.
- Choose culminating projects.
- Use resources to explore questions.
- Establish record-keeping, reporting, and ongoing assessment.

The final section focuses on evaluation and implementation of interdisciplinary curriculum. Assessment and evaluation of connected curriculum present special challenges because students move beyond the single subject approach and participate in more active, applied forms of learning. Martinello and Cook list the following key questions to use in considering assessment procedures in this kind of a context:

- Is there consistency between the learning objectives and the means of assessment?
- Do the means of assessment enable students to demonstrate their learning?
- Are the means of assessment reliable? Are they consistent over time?
- Can the means of assessment demonstrate student mastery of content and process?
- Can the means of assessment and findings be clearly understood by all involved (teachers, students, parents, and administrators)?

Martinello and Cook demonstrate how interdisciplinary study can be linked to curriculum and content standards and can address characteristics

Figure 5

The Qualities of Inquiry

Modes of Inquiry

Symbolic. The use of words, numbers, and other symbol systems to perceive, construct, and express meanings, and to form and frame inquiry.

Imagic. The use of images, sounds and tonalities, and kinesthetic-sensory ways to perceive, construct, and express meanings, and to form and frame inquiry.

Affective. The use of feelings and emotions to perceive, construct, and express meanings, and to color, direct, and drive inquiry.

Processes

- Reasoning
- Intuiting

Some Habits of Mind

- Finding and keeping focus
- Simplifying questions and problems
- Attentiveness
- Thinking fluently and flexibly
- Forming hunches
- Designing tests and experimenting
- Searching for patterns
- Using models and metaphors
- Finding elegant solutions
- Risk-taking
- Cooperating and collaborating
- Competing
- Perseverance and self-discipline

Martinell and Cook, 1994

of inquiry common to all disciplines. The authors write that "Each field of study has special characteristics that demand attention in the planning of educational programs... We believe that the most natural vehicle for accomplishing this is an interdisciplinary concept of thematic curriculum and instruction that is question-driven and investigative in character."

Richard E. Maurer

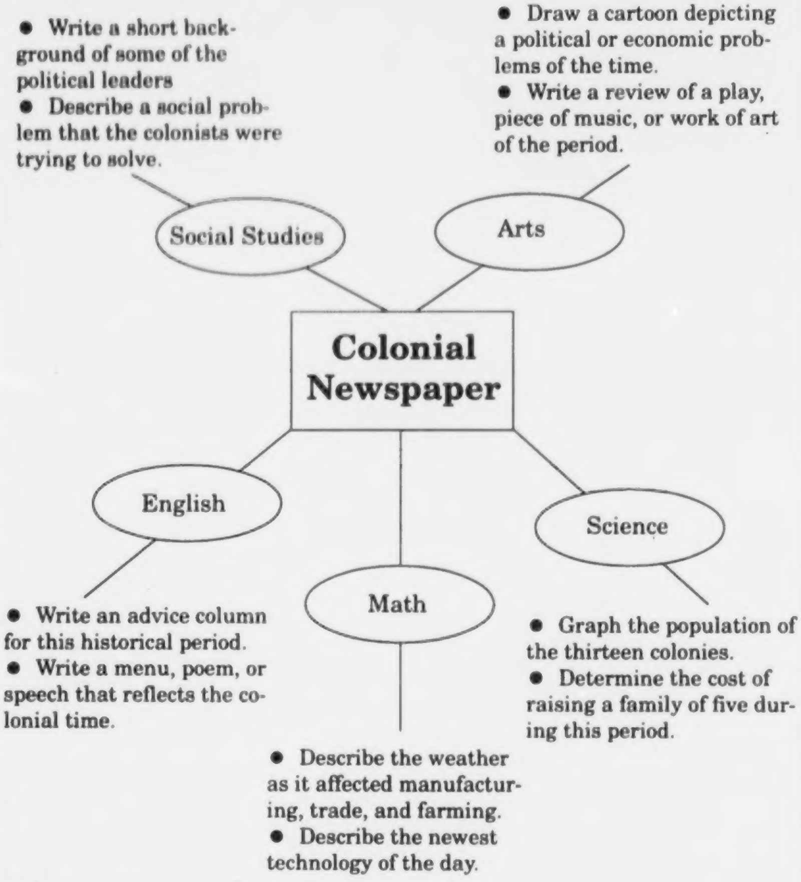
Richard E. Maurer, in his book *Designing Interdisciplinary Curriculum in Middle, Junior High, and High Schools*, explores connected curriculum and lists more than forty specific examples. Maurer collected these connected curriculum units from nationally recognized secondary schools. The examples can provide ideas for those ready to begin their own connected curriculum work.

Figure 6 illustrates the multidisciplinary approach involving several subjects in the study of a colonial newspaper. This framework unifies content of many different courses so that students can view colonial history and culture as a whole. It requires students to step out of the single disciplines and do work from all of them on one project, thus making it multidisciplinary.

Figure 6

Colonial Newspaper Multidisciplinary Curriculum

The colonial newspaper project is an example of a type of multidisciplinary curriculum that requires students to step out of their content area courses and view colonial history and culture as a whole. This figure illustrates how this project unifies the content of many different courses.



- Write a short background of some of the political leaders
- Describe a social problem that the colonists were trying to solve.

- Draw a cartoon depicting a political or economic problems of the time.
- Write a review of a play, piece of music, or work of art of the period.

- Write an advice column for this historical period.
- Write a menu, poem, or speech that reflects the colonial time.

- Graph the population of the thirteen colonies.
- Determine the cost of raising a family of five during this period.

- Describe the weather as it affected manufacturing, trade, and farming.
- Describe the newest technology of the day.

Richard E. Maurer

Integrated Approach

In the integrated model, there are no separate subjects. Content and skills are taught, learned, and applied as the need arises in studying the organizing center. Curriculum framework models based upon integration have also been referred to as transdisciplinary, problem-centered core, and unstructured core.

Integrated curriculum frameworks work best in an education system designed for flexible or block scheduling. In this kind of schedule, teachers have day-to-day control over instructional content, process, and time. The following examples are taken from the work of leading educators and theorists in the area of curriculum connections.

James Beane

James Beane, who has written extensively on connected curriculum, is a leading proponent of the integrated approach to teaching and learning. Beane wants educators to "leap over" the separate subjects in curriculum development. Instead of asking what each subject can contribute to a central theme, he advocates proceeding directly to identification of important concepts or topics related to the theme as well as engaging and relevant activities that might carry out the theme. Beane notes that content and skill are naturally integrated and used without regard for subject area lines. The disciplines are resources that can be drawn upon in the context of the theme, related issues, and activities.

Nothing in education is so astonishing as the amount of ignorance it accumulates in the form of inert facts.
—Henry Adams

Beane believes that the framework should be planned with the students who will be learning it. This process involves engaging young people in raising questions and concerns about themselves and their world, and then clustering these responses into themes. The final step is to identify activities and resources to address the chosen themes.

Beane, author of *A Middle School Curriculum from Rhetoric to Reality*, notes that those who use this approach have typically found that the themes young people choose are very much like those adults select; examples include living in the future, conflict, the environment, jobs and careers, and government and politics. But the questions and concerns students raise about the chosen themes may differ from those of adults because students have had different life experiences.

The following example of this approach is taken from a unit on violence studied by students of Amy McClellan, who conducted connected curriculum action research at Wilson Junior High School in Appleton, Wisconsin. Questions students raised during their study are followed by activities designed to answer these queries.

Why is there domestic abuse?

- Interview a police officer.
- Interview parents, neighbors, friends.
- Make graphs of abuse statistics in the last five years.
- Videotape a skit showing why people abuse others.
- Interview a counselor.
- Read newspaper and magazine articles about domestic abuse.

Why is there child abuse?

- Interview parents, neighbors, friends.
- Create a play or short skit.
- Write a story about abuse.
- Investigate child abuse in the community (read newspapers, watch television news, contact abuse center).
- Find books, articles, and videos about child abuse.

What are the effects of peer pressure on violence?

- Conduct research with books, magazines, and videos
- Interview a police officer.
- Draw pictures and posters.
- Interview a former gang member.
- Interview or survey other students.

For a fuller discussion of a curriculum collaboratively planned by students and teachers, see Beane's *A Middle School Curriculum: From Rhetoric to Reality* (1990).

Barbara Brodhagen

The article "The Situation Makes Us Special" (1995) is an account of the experiences of Barbara Brodhagen and her class of seventh graders at O'Keeffe Middle School in Madison, Wisconsin, during a yearlong adventure in teaching and learning. Brodhagen recounts how teachers and students can work to plan and create an integrated curriculum. The first step is to have students identify key questions about themselves and the world around them. The students brainstorm questions and concerns, and then categorize and prioritize them. The theme is developed and activities are drawn up, discussed, and selected in class.

Because students are involved in creating the curriculum, the activities reflect what they want to know as well as content required by the school district. Figure 7 shows activities students selected and prioritized for "Life in the Future." Conventional subject matter was drawn on for every activity because in order to do the activities, students needed to acquire knowledge and skills from the separate disciplines of mathematics, English, reading, science, social studies, art, technology, and more.

In her article, Brodhagen discusses how accountability and assessment came into play in the integrated curriculum. She also explains how she communicated with parents and community members and involved them in the project. The result was increased student involvement, achievement, and ownership of learning. Brodhagen's reflections are valuable reading for teachers who want their students to help plan an integrated curriculum framework.

Susan Drake

In *Planning Integrated Curriculum: The Call to Adventure* (1993), Susan Drake defines different ways to structure curriculum, including one technique she refers to as transdisciplinary—curriculum that is not limited to a particular discipline or school subject. She also refers to it as a "real world" approach to making curriculum connections.

Figure 7

Life in the Future

Top Activities Brainstormed by Students

- Design a model future community.
- Go to work with parents or other adults to find out what they do, what skills are needed and the like.
- Research family histories (genetics, stress factors, life span averages, cause of deaths, and so forth).
- Hold a debate on the pros and cons of new technologies.
- Find past predictions for the years 1990-2000 and see if they were accurate.
- Plan a reunion of our group for 2015.
- Predict inventions of the future.
- Make predictions for self and world.
- Survey others about life risks they have taken.
- Investigate different kinds of intelligence.
- Gather, analyze, and extrapolate statistics on accidents, gang violence, diseases, and so forth.

Barbara Brodhagen, Madison Metropolitan School District, Madison, Wisconsin.

Drake observes that when content is determined by student interests, a transdisciplinary approach begins with relevance rather than prescription. Nonetheless, she argues, this approach can be reconciled with stringent curriculum requirements.

Drake writes that interconnections in the transdisciplinary approach are vast, but if the theme is placed in a specific context, strategies and skills seem to merge. She suggests that teachers who use the transdisciplinary web should brainstorm around each "trigger word" as it applies to the chosen focus. Her example notes that if "car" is chosen as the focus of the web, the brainstorming can begin in any field, such as technology and design, safety and environmental concerns, economics and jobs, media and consumers, pollution and laws, or social issues. Drake and her colleagues suggest the best way to organize transdisciplinary curriculum is to focus on the connections themselves, and to treat understanding those connections as a life skill.

Drake's transdisciplinary approach moves away from the learning of isolated facts and skills to learning that requires new forms of assessment. She notes, "Paralleling this move to broad learning outcomes is a move toward qualitative, anecdotal assessment that often requires student self-evaluation as well as instructor evaluation." Parents are involved and the assessment process is ongoing, often recorded in portfolio form and demonstrated through application by students.

The process for creating curriculum connections is open-ended. Only time and resources limit the incorporation of rich and varied subject matter from all disciplines. As noted by the English mathematician and philosopher Alfred North Whitehead, "You may not divide the seamless cloud of learning. There is only one subject matter for education, and that is life in all its manifestations."

But it is not an easy task. Teachers who undertake this process, especially for the first time, will have many questions. This is to be expected, because the only way to truly understand any new subject is to find the answers to the many questions that naturally arise.

This section explains, in a step-by-step format, how to construct curriculum frameworks. The process has been broken down into four major stages.

- Review previous experiences with connected learning.
- Decide the reasons for connecting curriculum and set educational goals.
- Select and implement a connected curriculum framework.
- Learn from the experience.

Review Previous Experiences With Connected Learning

When people try something new, one of the first things they usually do is review their experiences in order to make use of existing knowledge and skills. Fortunately, most classroom teachers have already dealt with some form of connected curriculum. As students themselves, teachers may have taken a class or been involved in a project that incorporated a multidisciplinary or integrated framework. Many teachers may have already used such frameworks without considering it a connected learning experience.

For instance, elementary teachers often have their students write stories about a topic and then create art work to illustrate the theme. Although teachers may not be aware of it, this is an example of a multidisciplinary connected curriculum framework combining English with art. In other cases, teachers of a single discipline may assign their students "extension" activities that come at the end of a chapter in a textbook. Or their students may take part in projects that connect units or themes between or among several classes or even throughout an entire school. School-to-work programs have stressed the importance of connected learning experiences to help students make the transition to the world of work by making connections between academic and vocational and technical classes.

By considering these past experiences, teachers can prepare themselves to construct a connected curriculum framework. The following questions can help start this process.

- What experiences did teachers have with connected learning when they were students?
- Have teachers connected subjects in their classes in the past, even if they were unaware of it at the time? How did they do this?

- Have teachers made curriculum connections in their own classroom? Have they worked with other teachers to create connections?
- Have teachers given students opportunities to link school experiences with their lives outside of school? What kinds of experiences?
- Have their personal experiences with connected curriculum, either as a student or a teacher, been successful? Why? Why not?
- What new resources did teachers develop and use in past connected curriculum experiences?
- Did personal teaching styles change in a connected curriculum? In what ways?
- What were the effects of a connected curriculum on student learning?
- What problems or barriers did teachers encounter in implementing connected curriculum?
- What did teachers learn from dealing with these problems and barriers? What could be done differently next time to deal with them more effectively?
- How was the connected learning experience assessed?
- Were new assessment techniques used? If so, were they explained to parents and students?
- Did the new forms of assessment provide a clearer picture of student achievement?
- How were the connected learning experience and its results shared with other educators in the school?

Evaluating experience is an important first step in creating curriculum connections. It helps lay the foundation for successful teaching and learning.

Decide the Reasons for Connecting Curriculum and Set Educational Goals

In order to be most effective, the connected curriculum requires a clear idea and description of what it is designed to accomplish. Teachers considering using a connected curriculum should

- Determine why it makes sense to adopt a connected curriculum.
- Identify the basic goals, objectives, or standards (building, district, state, or national) the connected curriculum will have to meet. (Chapter 3 explains how to use standards in creating connected curriculum frameworks.)
- Evaluate the kinds of connections that will be created and how they will improve student learning.
- Make a list of those who will be involved with the connected curriculum (teachers, other school staff members and administrators, parents, students, and members of the community) and decide what role they will play. For example, if the framework requires a change in how students are scheduled, administrators must be involved in planning from the very beginning.

Select and Implement a Connected Curriculum Framework

A useful way for a teacher or team of teachers to begin creating a connected topic, unit, theme, or class is to select a model or framework that has been used in the past. Curriculum content, instruction, and assessment are essential parts of any educational program.

If the project involves a team of teachers, one way to begin would be to have each team member research a different model. The group can select the model best suited to its situation. Once a curriculum framework and organizing theme have been chosen, the teacher or team should consider how those choices will affect achievement of the goals established earlier. The following steps can be used as a guide to select and develop a connected curriculum framework.

> *Teachers of the past were skilled in handling words. The teachers of the future must be skilled in handling experiences.*
> *—Edgar Dale*

- Identify important content and skills that are essential for all students to learn.
- Evaluate how the topic, unit, theme, or class will contribute to student learning beyond the understanding of single subjects. What is the reason for creating the curriculum connection?
- Show how the connection contributes to student attitudes about learning, as well as to their overall development.
- List potential instructional activities, including some that require students to extend learning beyond the classroom.
- Pinpoint potential resources. Explore resources available through use of technology, for example, as well as expertise that students, parents, or members of the local community may be able to contribute.
- Decide how the connections are appropriate given students' level of development.
- Investigate how the connections will provide in-depth work for students at a number of ability levels, including opportunities for problem-solving and other higher level learning activities.
- Make plans for assessment, remembering to provide opportunities for student involvement. Assessment plans should address how results will be communicated to students and parents, as well as what products or performances will be included.
- Determine the responsibilities of participants and create a timeline for the plan. Include time to evaluate progress of the connected curriculum. At regular intervals during the connected curriculum experience, consider the evaluations and make changes as needed. Potential changes could be made in the plan, in teaching strategies, in the relationships of the different people or groups involved, or in specific instructional activities.
- Implement the connected curriculum framework.

Teachers will want to consider many questions in selecting a framework. One of the things to take into consideration is how prepared students are for connected learning. Teachers who implement new instructional strategies often discover that their students lack the necessary skills to move from the old subject-centered learning system to a connected approach that requires greater student responsibility. Students who have been successful at providing correct answers on tests or in class often find it more difficult to apply their knowledge or skills in new ways or to demonstrate what they know in a situation where there is no predetermined, "correct" answer. Also, students who have primarily done their school work individually may not have the skills to work in groups. Many students need additional knowledge and skills in order to move from the subject-centered to the connected classroom (See figure 10).

...implementing a connected curriculum can be both intimidating and exciting.

Learn From the Experience

For many teachers, even those with years of classroom experience, implementing a connected curriculum can be both intimidating and exciting. Teachers want to develop new ways to motivate and involve their students, but moving from familiar ways of teaching and learning to new and challenging ways can result in feelings of insecurity and self-doubt. Some teachers initially find it difficult to be both a teacher-director and a teacher-facilitator, although both are appropriate roles. Moving from a subject-centered approach to a connected curriculum requires flexibility on the part of the teacher, who must use a greater variety of instructional strategies. For example, it may be necessary to move from direct teaching to cooperative work groups to independent activities during an instructional period. Connected teaching and learning requires teachers to locate and use content sources that go beyond material in traditional textbooks. Teachers also note that connected curriculum does not work well without the involvement and support of parents, other teachers and staff members, and school administrators. Finally, teaching for connections requires new skills and behaviors for students.

Teachers involved in the CTC Project discovered that action research was an ideal way to evaluate the effectiveness of their curriculum connections and to learn from their experiences. The action research process emphasizes an ongoing cycle of learning and improvement. Even if the formal action research process (see chapter 4) is not used in conjunction with the connected curriculum, it is essential that teachers evaluate and reflect on their experiences and make changes. Otherwise, teachers will never be able to realize their goal of improved student achievement. In going through this process of evaluation, reflection, and change, teachers will want to consider the following questions. (Figure 8 is a condensed version of these four stages. Use it as a checklist to go through the process.)

How does curriculum connection affect teaching and learning?

Do students learn more? Do they retain more? Are they better able to apply what they learned? Are they able to transfer what they learned to new areas of study? What forms of assessment are used? Are these forms appropriate? How can the results be used for accountability?

How does curriculum connection affect teaching styles and strategies?

Do teaching styles and strategies change? How and why? Is a lack of experience in moving away from single subject instruction difficult? What problems does this cause? What are the advantages and disadvantages?

Figure 8

How to Construct a Connected Curriculum Framework

There are four components to the four-step process. These components serve as a guide to process curriculum connections. The four steps do not necessarily proceed in a certain order, nor are they intended to be comprehensive. Creating connections is always a unique and new experience; the process for creating curriculum connections is open-ended.

Review Your Experiences With Connected Learning

- What connected experiences did you have as a student? What made them effective? Ineffective?
- What kinds of curriculum connections have you already made in your classroom? What worked? What didn't work?
- How did you measure the effectiveness of connections?
- What did you learn from your experiences?

Develop and Implement the Connection

- What content is important? Select a framework most likely to promote it.
- Identify a range of connecting activities and assessments that advance the content.
- Determine responsibilities for all involved in the connection and establish a timeline and evaluation plan.
- Implement the connection.

Identify the Goals of the Connection

- What are the goals, objectives.
- What standards will be addressed?
- How will the connection link with goals?

Learn From the Experience

- How did the curriculum affect teaching and learning?
- How did the connection affect teaching styles and strategies?
- How did the connection affect content sources?
- How did the connection affect the status quo in the school.

How does curriculum connection affect content sources?

What new sources are developed and used? Who helps develop new resources? What other sources could be used in the future? Are students able to use new technologies, such as the Internet, to access new sources of content? Is the use of such new technology integrated into the curriculum connection?

How does curriculum connection affect students and other stakeholders?

Do students have trouble adapting to a connected curriculum? Are students aware of and involved in the curriculum connections? Do they understand what is expected of them? Is there support or involvement of parents, colleagues, administrators? Why or why not? Does the connection alter the school day's schedule? What barriers arise? What can be done differently next time to improve the connected learning experience?

Lessons from CTC Teachers

Participants in the CTC Project discovered that connecting the curriculum is a learning process in itself. They also found that their plans did not always work out as expected. Nonetheless, although the process could be difficult, time consuming, and even exasperating, it was worthwhile because of the many benefits it produced for teachers and students alike. Project participants offer the following lessons based on their experiences:

- Collaborative planning time is essential. Planning time is necessary for teachers to reflect on what they are doing, evaluate progress, and make changes as needed.
- Parents and administrators should be brought into the planning process at the earliest stages and should continue to be participants throughout. At the minimum, parents and administrators should be aware of how the goals, content, strategies, assessment measures, and expected results will affect students.
- Parents and community members can be a great resource for connected teaching and learning.
- Parents, administrators, the community, and colleagues should be shown how the curriculum connections provide rigorous learning experiences and reflect challenging content standards.
- It is important that the plan identify how the connected curriculum will meet or address all mandatory standards and goals, whether at the school, district, state, or national level.
- Cute or gimmicky topics or themes should be avoided.
- The plan should address the diverse characteristics and needs of all students.
- The connected curriculum should provide for student assessment and program evaluation to measure student progress, perhaps through the use of performance assessment. Teachers should decide whether students will have opportunities to assess themselves, and determine how to report progress to all parties.
- Teachers who plan connected curriculums must decide how to determine if a connected curriculum leads to improved student learning. Teachers also need to find a method to evaluate the effectiveness of curriculum connections.
- Teachers have to identify and prepare for potential pitfalls. Unexpected problems and learning opportunities will surely occur. If potential problems have been anticipated, the experience will proceed much more smoothly.

References

Beane, James A. *A Middle School Curriculum: From Rhetoric to Reality*. Columbus, Ohio: National Middle School Association, 1990.

Brodhagen, Barbara. "The Situation Made Us Special," in *Democratic Schools*. Michael W. Apple and James A. Beare, eds. Alexandria, VA: Association for Supervision and Curriculum Development, 1995.

Drake, Susan. *Planning Integrated Curriculum: The Call to Adventure*. Alexandria, VA: Association for Supervision and Curriculum Development, 1993.

Fogarty, Robin, "Ten Ways to Integrate Curriculum." *Educational Leadership 49*. October 1991, pp. 61-65.

Jacobs, Heidi Hayes, ed. *Interdisciplinary Curriculum: Design and Implementation*. Alexandria, VA: Association for Supervision and Curriculum Development, 1989.

Martinello, Marian L. and Gillian E. Cook. *Interdisciplinary Inquiry in Teaching and Learning*. New York: Macmillan, 1994.

Maurer, Richard E. *Designing Interdisciplinary Curriculum in Middle, Junior High, and High Schools*. Boston: Allyn & Bacon, 1994.

2

BEST COPY AVAILABLE

Key Beliefs

When organizers of the CTC Project began their work, they realized it was necessary to arrive at a common philosophy. Participants agreed on project goals and on how to reach those goals. The discussions involved educators from the kindergarten through the university levels and led to the development of project beliefs that reflect the connected approach to teaching and learning.

For educators to move to a connected system, they need to establish their own consensus about what is important in education. This frame of reference or foundation of beliefs helps educators develop and sustain connected teaching and learning. Educators involved in connecting curriculum are advised to develop their own key beliefs about education. The following beliefs are those developed by CTC project participants and will serve as examples for other groups.

- **Educational systems should be based on learning theory and research.**

A tremendous amount of research in the past few years has shaped thinking about student learning. Educators wrestle with philosophical implications raised by new data and new theories on cognitive and cultural views about teaching and learning. The fact that educational research is constantly adding to our base of knowledge underscores the importance of teachers continually investigating and considering ways to improve their own learning and teaching.

> *The development of general ability for independent thinking and judgment should always be placed foremost, not the acquisition of special knowledge.*
> *—Albert Einstein*

- **Students learn by integrating new information and experiences with what they already know.**

A vital goal of education is to ensure that students have the ability to integrate new material with what they already know and have experienced, and to actively use their knowledge and skills to solve problems and accomplish tasks. When students move their thinking beyond specifics facts, sequences of events, generalizations, and solutions, they can develop larger patterns of understanding and apply their knowledge to significant, complex questions.

Learning and personal development also occur informally as a part of daily life, through self-study, and through instruction. Those involved in teaching and learning should consider the broader contexts in which learning exists.

- **All members of society share responsibility for creating and sustaining a learning community.**

The connected curriculum approach encourages involvement and active collaboration by everyone—professional educators, students, parents, business people, and other community members—to develop learning communities. The entire community must convey to the student the message that learning matters. The community, working locally, should make decisions also on the specifics of what students are to learn. These decisions arise from discussion of student interests and learning needs, community norms, and knowledge base requirements.

- **Schools and classrooms are complex social settings influenced by the culture in which they exist.**

The physical, personal, social, political, and cultural contexts in which schools exist all have an effect on teaching and learning systems and the individuals involved in those systems. Community members should examine educational practices in light of current and historical contexts, including the environment in which these practices have developed. Present conditions should be examined in relation to the past, but with an eye toward future possibilities.

- **Equity is the practice of justice, impartiality, and fairness in the treatment of all involved in learning. It should be a basic component of education.**

Students are more likely to learn successfully in an equitable community. Decisions about teaching and learning situations should be based on concerns about the well-being of the individual student, with equal consideration given to the rights of others. Educational equity means focusing on success for every student. The challenge is to establish an environment that allows for diversity but also encourages shared concerns, tradition, and change.

- **Curriculum, instruction, and assessment are interdependent and should be purposefully linked.**

What is done with one component affects the others. Curriculum is taught, instruction is how the curriculum is taught, and assessment is how one determines what students have learned. Each component influences and depends on the others.

- **Reform is an ongoing process to improve teaching and learning.**

Everyone involved in the learning community must realize that teaching and learning can and must change. This requires an appreciation and understanding of contributions to the field of education from the biological sciences as well as research on efficient and effective learning structures.

Learning Theory

To understand the philosophy behind a connected curriculum, one needs to consider some of the learning theory that forms a basis for it. In recent years, studies of learning have produced new ideas about how to structure curriculum, how to teach, and how to find out what and how well students are learning. Following is a sampling of current theory about learning; these examples introduce readers to some of the new ideas that shaped the development of connected curriculum.

- Howard Gardner, in *Frames of Mind: The Theory of Multiple Intelligences,* argues that there is more than one type of intelligence. He claims people have at least seven intelligences: linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, interpersonal, and intrapersonal. He argues that schools have focused mainly on linguistic and logical-math-

Figure 9

Seven Ways of Knowing: Multiple Intelligences

Logical/Mathematical Intelligence

Often called "scientific thinking," this intelligence deals with inductive and deductive thinking/reasoning, numbers, and the recognition of abstract patterns.

Verbal/Linguistic Intelligence

This intelligence, which is related to words and language—written and spoken—dominates most Western educational systems.

Intrapersonal Intelligence

This intelligence relates to inner states of being, self-reflection, metacognition (thinking about thinking), and awareness of spiritual realities.

Interpersonal Intelligence

This intelligence operates primarily through person-to-person relationships and communication.

Music/Rhythmic Intelligence

This intelligence is based on the recognition of tonal patterns, including various environmental sounds, and on a sensitivity to rhythm and beats.

Body/Kinesthetic Intelligence

This intelligence is related to physical movement and the knowledge/wisdom of the body, including the brain's motor cortex, which controls bodily motion.

Visual/Spatial Intelligence

This intelligence, which relies on the sense of sight and being able to visualize an object, includes the ability to create internal mental images/pictures.

Adapted from Lazear (1991).

ematical intelligences at the expense of the other five, which he says are also important in the development of the student. Figure 9 is an adaptation of Gardner's seven intelligences from the book *Seven Ways of Teaching: The Artistry of Teaching with Multiple Intelligences* by David Lazear. In his 1991 book, Lazear offers teaching and learning strategies that expand the practical application of Gardner's multiple intelligence theory.

- Renata and Geoffrey Caine, authors of *Making Connections: Teaching and the Human Brain*, cite studies showing that the brain learns best when it works to solve problems or accomplish specific tasks instead of merely absorbing isolated bits of information. The brain's primary function, they say, is to seek patterns in new learning. The authors believe that educational practices should reflect new knowledge and theories about how the brain functions.

- Lauren Resnick, in *Education and Learning to Think,* says people learn better if they are asked to think in more complex ways. She theorizes that even in elementary school, students will learn more if they are given several ways to look at a problem and if they are asked to find more than one way to solve it. She says when people are asked to come up with only one right answer, they may not gain a complete understanding of the problem.
- Robert Sylwester, in *A Celebration of Neurons—An Educator's Guide to the Human Brain,* correlates current scientific theories on how the brain processes information. He suggests that these new theories have broad educational applications that can be utilized in today's schools to improve teaching and learning. Sylwester says new research shows that many current beliefs and practices about instruction, learning, and memory have become outdated and are no longer valid. Classrooms in the future may "focus more on drawing out existing abilities than on precisely measuring one's success with imposed skills, encourage the personal construction of categories rather than impose categorical systems, and emphasize the individual, personal solutions of an environmental challenge ...over the efficient group manipulation of the symbols that merely represent the solution" (1995).

The new theories on teaching recognize the need to focus education on the learner. Figure 10 demonstrates a continuum of the underlying assumptions, beliefs, and practices commonly found in subject-centered classrooms on one end with those of learner-centered classrooms on the other. Connected learning experiences move toward the learner-centered side of the continuum. While all of the practices listed are appropriate at certain times in the educational process, connected curriculum moves the teacher toward a system that focuses on the learner instead of on the subject matter.

New theories on teaching recognize the need to focus education on the learner.

Equity

Educators today are challenged by increasing diversity in classrooms due to changing demographics. This increasing diversity amplifies the need to ensure equitable treatment of all students in all aspects of the learning environment. Race, gender, national origin, class, disability, and the protected groups covered by pupil nondiscrimination laws must be considered when planning change in schools.

Educational equity requires educators and schools to have high expectations and high standards for all students, regardless of their race, gender, socioeconomic class, or any other social and demographic factors. Equity strategies should be planned, systemic, and focused on the core of the teaching and learning process, including curriculum, instruction, assessment, school environment, and school culture. Planned strategies will help to eliminate bias, stereotyping, and prejudice from teaching and learning. Just as the connected curriculum weaves together separate disciplines, it

Figure 10

Teaching and Learning Continuum

The chart below suggests a continuum of practices for teachers and schools to consider in moving from a subject-centered approach to one that is learner-centered.

Subject-Centered Classroom	**Learner-Centered Classroom**
Subjects are treated as separate disciplines.	Teaching and learning are integrated.
Numerical and linguistic abilities dominate.	Multiple intelligences are incorporated.
Teacher perceived as knowing correct answers.	Teachers and students are co-learners.
Teacher plans activities.	Students are actively engaged in learning which they have helped design.
Teacher conducts all assessments.	Students routinely assess themselves.
Learning is focused on knowledge and recall.	Learning involves higher order thinking skills.
Learning takes place within the school.	Learning involves the classroom and the community.
Learning is dominated by textbooks.	Multiple learning resources within and without the school are incorporated.
Information is organized, interpreted, evaluated, and communicated to students by teachers.	Information is acquired, organized, interpreted, evaluated, and communicated by students to appropriate audiences.
Organizing system of the classroom is fixed with standardized class size and school schedule.	Developmentally appropriate and flexible school structure is promoted. Organizing systems incorporate a variety of structures to suit the particular teaching and learning process.

can also help students from differing backgrounds establish a common ground as they come together in shared learning activities. As one education writer noted, "The major goals of a curriculum that fosters multicultural literacy should be to help students to know, to care, and to act in ways that will develop and foster a democratic and just society where all groups experience cultural democracy and empowerment" (Banks, 1991).

Curriculum materials can reflect the multicultural nature of the world and include social, historical, and cultural contributions by all ethnic groups and women. A multicultural, nonsexist curriculum stresses connections between the local culture of students and that of cultures around the world. Research reveals that culturally relevant teaching has a profound, positive impact on learning and student achievement.

Educators creating a learner-centered environment will vary teaching styles and strategies for individual students, consider individual differences in learning needs, and plan ways to engage every child in learning. Key points include the following:

- **Content of the curriculum.** What is taught? Whose knowledge is taught?
- **Curriculum goals and outcomes.** What is the purpose of what is taught? What can and should be taught at which levels? Are those goals appropriate for all students?
- **Instructional strategies.** How are the curriculum and its goals accomplished? How do students become engaged in learning? How do cultural values and prior knowledge influence student engagement in learning?
- **Assessment.** How do schools determine what students have learned? How will schools evaluate their own success and that of their students? How can schools assure that assessment techniques or strategies are fair?

Assessment

A connected curriculum links not only content areas, but also assessment and instruction. In addition to providing accountability, an assessment system can provide meaningful information about the effectiveness of the instructional process and increase opportunities for student learning and development. Assessment can provide immediate insight on student growth, drive performance to higher levels, and define standards and expectations for learning (Shepard, 1989).

Let the student be asked for an account not merely of the words of his action, but of its sense and substance.
—Montaigne

The connected curriculum model is based on the connected view of learning in which the whole is greater than the sum of the parts. This model rejects the idea that learning and assessment can be broken into small parts, tested, and analyzed. It recommends that learning be directed toward the constructivist ideals of extended understanding, strategic learning, collaborative work, higher order thinking skills, and connections across subject areas and issues.

Over the last few years, assessment has undergone significant changes and new models have been created to assess learning through connected curricula. One way to assess connected learning is to tie performance standards to complex tasks and to portfolios that monitor learning over time. Any assessment device should be as authentic as possible and should link standards and expectations to real world tasks and performance standards.

Because connected learning does not consist of isolated skills or bits of knowledge, assessment should focus on analysis of complex tasks. These kinds of tasks give students with different learning styles, background experiences, and strengths a variety of ways to approach the activities. This approach does not eliminate or diminish academic content—assessments can link knowledge of challenging content with high levels of student performance. In addition, assessment tools such as portfolios recognize that meaningful measurement of growth extends over time. Portfolios are one type of assessment used in many school districts to promote curriculum connections.

Technology

Teaching for curriculum connections promotes the use of new technology in the classroom. The International Society for Technology in Education (ISTE) notes that technology must be integrated into the curriculum instead of being used as a supplement to the curriculum (Ludwig, 1990). Among ISTE's recommendations are the following:

- The teacher centered, "factory" model must change to a learner-centered model in which the student is an actively engaged worker and a full partner in the learning process.
- Students must engage in real world problem-solving. They should be able to use technology to engage in activities integrating learning from all major disciplines, and to gather and process information, solve problems, and express ideas.

> *We are drowning*
> *in information*
> *but starved*
> *for knowledge.*
> *—John Naisbett*

- Although schools should continue to teach facts, the focus of learning should be changed from the acquisition and retention of facts to problem-solving.
- The artificial boundaries between disciplines must be eliminated. Instead of learning disciplines in isolation, students should undertake projects to learn in an integrated manner.
- Because educational technology opens new worlds of learning, supports increased development of higher order thinking skills, and makes possible a wide variety of learning styles, new assessment techniques that reflect new skills and new learning environments must be developed to supplement and, eventually, to replace conventional tests.

Effective integration of technology as a learning and teaching tool requires training in computer use as well as the availability of appropriate technology. Teachers can evaluate new educational tools and design appropriate student activities. New technologies can also become effective tools for the assessment process, including portfolio assessment. New technologies allow teachers to be more than a dispenser of knowledge or instruction. As facilitators, teachers can guide students in open-ended projects. For their part, students can provide further input through increased access to information. Because of the access to information now available, the curriculum will increasingly emerge from the interaction of teachers, materials, and students.

Systemic Reform

Often, teachers working to create curriculum connections teach in educational systems that use the separate subject approach. Much of the existing educational system presents barriers to making curriculum connections. For example,

- students are expected to move in progression through each grade level, regardless of their readiness or learning style preferences;
- the school day is divided into subjects and periods, making it difficult for teachers to develop connections;
- programs that change the status quo often meet with resistance from administrators, faculty, and the community; and
- teachers may not receive adequate planning time, resources and staff development opportunities, appropriate teacher preparation, or administrative and parental support.

Many educators and parents recognize that school structures can be better aligned with learner-centered instruction. Calls for reform of the educational system are frequent topics of politicians and the media.

In *School Change Models and Processes: A Review and Synthesis of Research and Practice,* Egermeier and Sashkin argue that systemic reform holds the most promise for meaningful change. Systemic reform involves reforming and restructuring the entire enterprise of education. It ranges from changes made at the national and state levels to actions taken in a single district, building, or classroom by teachers, students, parents, and the community. Of course, the system cannot be changed unless changes are made in the parts, the people, and the schools themselves. This means that systemic reform is based, ultimately, on development of a strong and common purpose shared by the entire learning community, including not only education professionals, but also all other stakeholders

A learner-centered educational system encourages teachers to take on many roles—as facilitators, resource allocators, collaborators, researchers, and so forth. In their various roles, teachers help students acquire facts as well as gather data, form and test hypotheses, conduct research, develop problem-solving skills, and learn to work together. In this model, students, working both individually and in cooperative groups, are actively engaged in the learning process. As often as possible, they work on real world problems and questions.

Although solutions will vary, many possibilities for addressing systemic constraints to curriculum connections are being explored. Curriculum connections and other changes in the design of educational programs may have to begin with a limited number of faculty. Teachers committed to helping students make learning connections can work together and support each other in efforts to link their subjects in multidisciplinary or integrated units.

References

Banks, James. A. "Multicultural Literacy and Curriculum Reform." *Educational Horizons,* 69(3) (1991), pp. 135-140.

Caine, Renata and Geoffrey Caine. *Making Connections: Teaching and the Human Brain.* Alexandria, VA: Association for Supervision and Curriculum Development, 1991.

Egermeier J., and M. Sashkin. *School Change Models and Processes: A Review and Synthesis of Research and Practice.* Washington, DC: US Department of Education, 1993.

Gardner, Howard. *Frames of Mind: The Theory of Multiple Intelligences.* New York: Harper Collins, 1985.

Lazear, David. *Seven Ways of Teaching: The Artistry of Teaching with Multiple Intelligences.* Palatine, IL: IRI Skylight, 1991.

Ludwig, Brian. VISION:TEST Technologically Enriched Schools of Tomorrow. Eugene, OR: International Society for Technology in Education, 1991.

Resnick, Lauren. "Education and Learning to Think." *Middle School Journal*, 21 (1989), p. 38.

Shepard, Lorrie. "Why We Need Better Assessments." *Educational Leadership*, 46 (April 1989), pp. 4-9.

Sylwester, Robert. *A Celebration of Neurons—An Educator's Guide to the Human Brain.* Alexandria, VA: Association for Supervision and Curriculum Development, 1995.

Standards and Connected Frameworks

3

Using Standards
Using the Wisconsin Learner Outcomes
Content and Standards in a Connected Curriculum
References

BEST COPY AVAILABLE

Using Standards

Creating connections is just one part of teaching and learning. Of equal importance is how to link the connected curriculum with standards and assessment. Many educators who use the separate subject approach rely on textbooks and associated curriculum materials, which have usually been chosen by the local school district, to fulfill the requirements of the curriculum. However, teachers who bring in content from other sources must be able to identify the knowledge and skills their students need to meet existing content standards. Connected curriculum frameworks can use content standards as a platform on which to build instructional activities that lead to authentic student learning.

Educators, parents, and elected officials have considered how standards fit into efforts to reform education. These stakeholders have asked the following questions:

- What should students know and be able to do?
- How can schools assess whether students actually acquire the knowledge and skills they need?
- How should results of these assessments be communicated?
- How can educators use standards to organize knowledge?
- How can educators use standards to improve school practices?
- How can educators incorporate standards into professional development models to foster teacher reflection and growth?

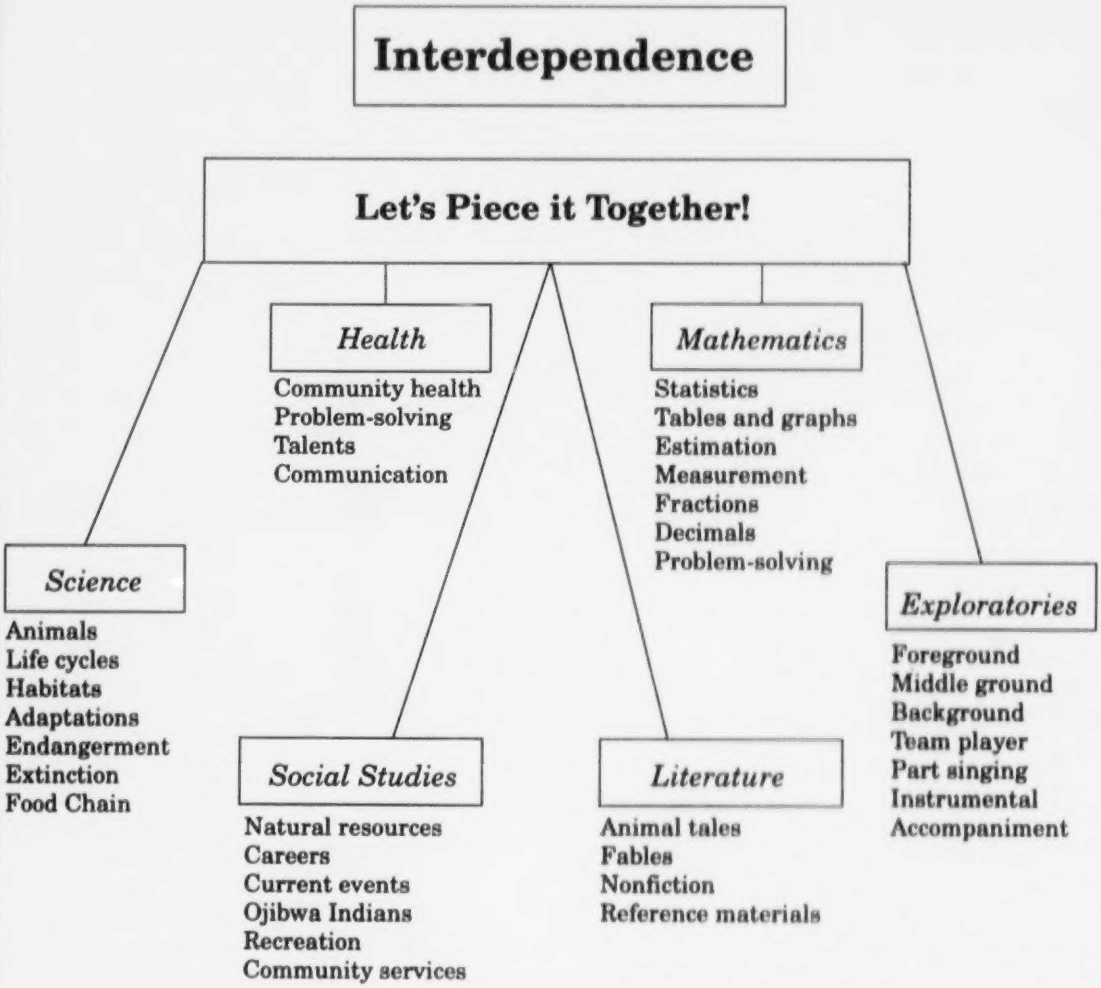
How do teachers know their students are learning important facts and concepts? One way is to use content standards as a tool to determine to what extent connected curriculum addresses content standards. Below are examples of using standards to evaluate connected curriculum frameworks.

Multidisciplinary Example

At Robbins Elementary School in Eau Claire, Wisconsin, teacher Rebecca Mattson and her colleagues examined the content of each of the subjects covered in a third-grade multidisciplinary unit. The teachers focused on the concept of interdependence through the theme "Let's Piece It Together." The teachers identified generalizations about interdependence and topics in each subject that contributed to the theme (see figures 11 and 12). The following guiding questions helped their students focus on specific content for separate subjects:

- What do we depend on for our survival?
- What do you have to offer the community at the present time? In the future?
- Why do we need each other?
- Can you think of examples where something has gone wrong because humans have made a change in the environment?
- How do the decisions you make affect the people, plants, and animals around you?
- What are your strengths and weaknesses? How can you build upon your strengths and compensate for your weaknesses?
- When are you helping others and when are you enabling them not to grow?

Figure 11



Interdependence

Let's Piece it Together!

Health

- Community health
- Problem-solving
- Talents
- Communication

Mathematics

- Statistics
- Tables and graphs
- Estimation
- Measurement
- Fractions
- Decimals
- Problem-solving

Science

- Animals
- Life cycles
- Habitats
- Adaptations
- Endangerment
- Extinction
- Food Chain

Exploratories

- Foreground
- Middle ground
- Background
- Team player
- Part singing
- Instrumental
- Accompaniment

Social Studies

- Natural resources
- Careers
- Current events
- Ojibwa Indians
- Recreation
- Community services

Literature

- Animal tales
- Fables
- Nonfiction
- Reference materials

Generalizations

- Survival is the result of the interdependence of members of a community.
- Being interdependent is acknowledging the fact that every member of the community/team has something important to contribute to it.
- Interdependence causes balance within a system or community.
- When members of a community are interdependent, the community functions better.
- Interdependence creates an opportunity to expand on one's personal strengths and abilities.

Figure 12

Types of Learning in Interdependence Unit

Explorations

- practice "fair play" during all activities and games and understand the importance of fair play and its effect on others
- perform a rhythmic accompaniment to various songs
- draw a camouflaged animal to be cut apart into a jigsaw puzzle
- focus on the importance of camouflaging

Health

- learn how to choose safe activities when home alone
- discuss safe ways to use electrical appliances
- describe the characteristics of a healthy community
- cite examples of how people in the community work together to solve health problems
- explain health-care jobs
- name a community health problem
- identify different stages of the life cycle

Language Arts

- make a class animal riddle book in which students will give clues and ask "Who am I?"
- write informational paragraphs, reports, or nonfiction books about animals
- respond to different pieces of literature
- practice choral reading of poems whose work is related to this theme
- participate in class discussion about animals and people

Mathematics

- use estimation or counting where appropriate
- read and write fractions
- find fractional parts of whole numbers and write decimals
- use a variety of measurement units and understand the techniques of measurement
- explore the characteristics of objects and how to measure them
- acquire the skills associated with exploring area and perimeter
- read and interpret graphs

Reading

- learn about antonyms and synonyms and use a thesaurus
- distinguish author's purpose
- classify information into categories
- use problem solving-skills to discuss the dilemma of endangered animals
- compare/contrast animals, their habitat, and their food
- decode context clues, homophones, elements of nonfiction and fiction
- use the dictionary to understand words with multiple meanings
- become familiar with the atlas, encyclopedia, and dictionary

Science

Learn that:

- some animals come from eggs
- most mammals give birth to living young
- animals are dependent on their environment according to their needs—food, food chain, shelter, and so forth
- animals adapt to their needs (herd, camouflage, migration, and so forth)
- many useful things come from animals such as down, leather, and wool
- some kinds of wild animals are protected or endangered, or extinct
- park rangers, game wardens, and zoologists protect wildlife

Social Studies

- understand that people have different roles as community members
- understand that people use recreation to balance their lives
- understand that natural resources attract new residents
- understand that city government provides services for the community

The team also developed activities and listed unit outcomes (see figure 13) that provided a format to structure and assess the unit. Mattson made some informative observations about how connected units can be structured to link content and standards. (Her comments and those of other teachers—and some students—appear in italics.)

Figure 13

Interdependence Unit Activities and Outcomes

Students will utilize reference materials to research about an animal. They will develop an informational paragraph, report, or diorama. Students will present their project to the class.

All third grade classrooms will collaborate to create a mural of the area's natural habitat before people roamed here. Each group will focus on an area, such as pond dwelling life, forest life, river life, and/or other woodland areas.

Students will study the effects human decisions/interventions have upon the wildlife of our land and discuss what they can do to help in our community.

Students will be exposed to a variety of community workers. They will ask questions about their careers and work toward understanding the important parts these community workers play in our area.

Students will work with a community member in the classroom through the Junior Achievement program called "Our City" to help them discover a variety of occupations, identify what businesses can be found in a typical city, develop the students' understanding of how workers apply their skills to their jobs, and the importance of education for future career development.

Students will compile informational facts about the "first people" that settled in the area. They will use these facts to better understand the importance of the land and wildlife in this area to this group of people. They will also be involved in making pictographs, dream catchers, and experiencing other aspects the culture of the Ojibwa people.

We began planning with the district's key curriculum strands in mind, believing that state and national standards were included in the district standards. I found that our curriculum in Eau Claire strongly reflects the national standards. District standards were used because they fit into the realm of what our unit on interdependence was all about. I didn't start with the standards to build the curriculum, but I found that connected curriculum is capable of helping us meet the national standards in education... I learned that students learned more content this way. No one in my class, including the learning disabled students, scored below 70 percent on the written assessment. This is a first for me. It always seems like someone is having difficulty understanding content but the more connections students can make, the better they seem to retain and understand the information. In the interdependence unit we addressed one standard each in dance, theater, visual arts, physical education, and civics; six in geography; two in history; seven in math; two in science; and five in social studies. Other standards were included in thematic units that took place throughout the school year.

Integrated Example

Barbara Brodhagen and Mary Ploeser at O'Keeffe Middle School in the Madison Metropolitan School District worked with their students to construct an integrated thematic unit on outer space. The theme and class activities were drawn from student questions and concerns (see figure 14). Student activities were assessed to make sure the required content was included. Figure 15 shows the types of learning involved in the thematic unit.

Involving students in making decisions related to curriculum helped them to understand what they were responsible for learning. When assessment showed that activities did not address particular learning requirements, the necessary content was integrated into other student activities. District requirements that did not logically fit into the parameters of the unit were added to other units or themes, or they were simply taught separately. With experience, both teachers and students became skilled at linking required learning standards to curriculum frameworks.

As Brodhagen notes (1995), "We realized that this new curriculum approach would prompt someone to ask for documentation of students' learning. What better way for us to gather this information than by asking the group? By middle school, most students are able to use the language of education, so they listed, for example, 'read, write, communicate, do research, use math, work with maps, graphs, and tables, use the scientific method, use computers, listen, give reports, and work in groups.' At times the group was amazed at how much they had accomplished and learned. They were being asked to actively educate themselves."

The project led to increased student involvement, ownership of learning, and higher levels of student achievement.

In the article, Brodhagen explains how accountability and assessment measures were handled. She also details methods used to communicate with parents and community members and to involve them in the connected curriculum project. Brodhagen recounts how the project led to increased student involvement, ownership of learning, and higher levels of student achievement.

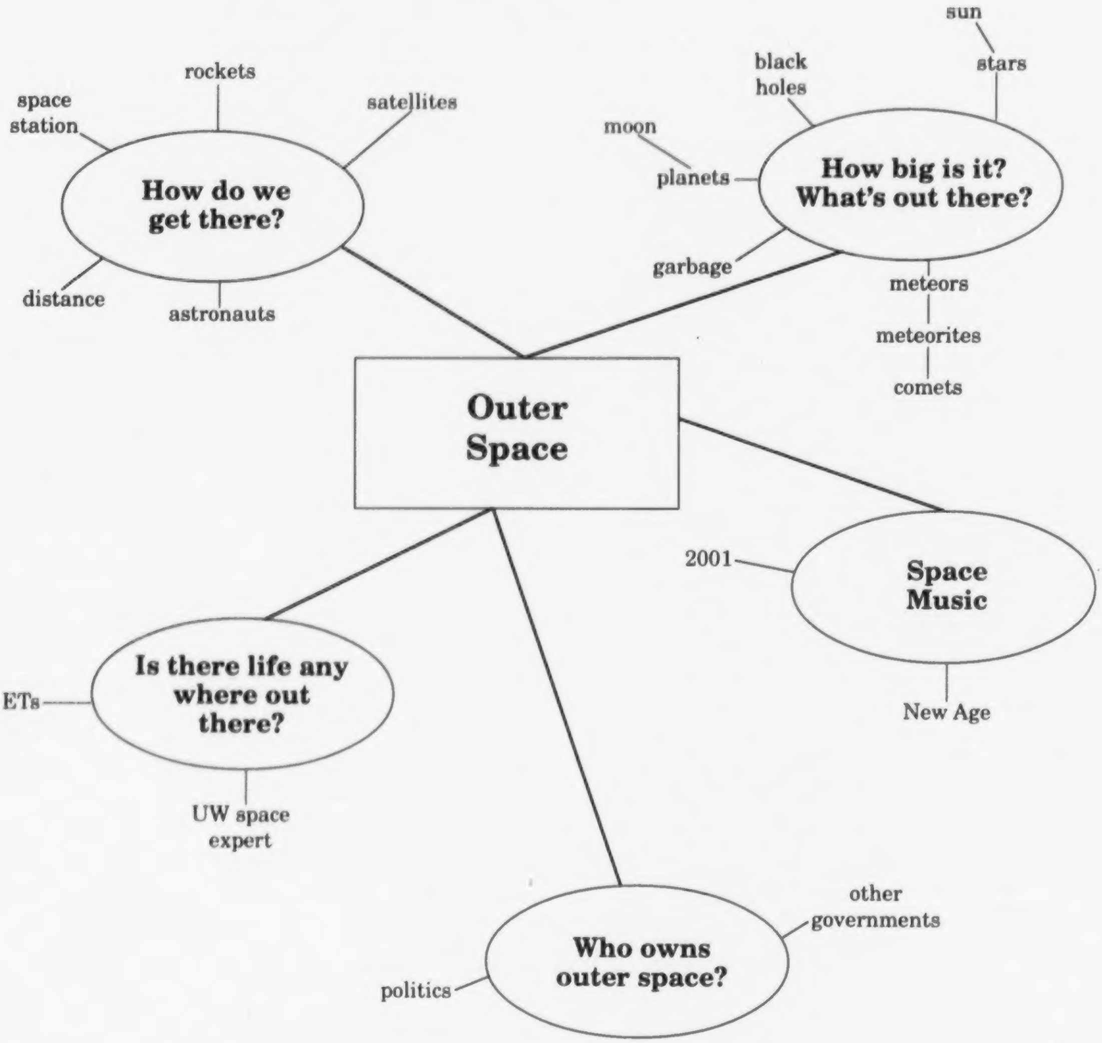
Using the Wisconsin Learner Outcomes

A number of teachers designing connected curriculums found the Wisconsin Learner Outcomes (see figure 16) a useful tool to evaluate the rigor and thoroughness of a connected curriculum. The 17 learner outcomes were generated by Wisconsin educators and citizens in a series of workshops. The Learner Outcomes described ways in which people demonstrate knowledge and skills in a meaningful context. One way to determine whether student learning experiences are both rigorous and effective is to use the outcomes to construct and/or evaluate connected curriculum frameworks.

Because learner outcomes describe a wide range of desired student behaviors, teachers can use them to assess connected curriculum frameworks for the knowledge and skills their students have learned. It is almost impossible for one unit or theme to be broad enough to encompass all 17

Outer Space Unit Teaching and Learning Map

Students developed the following questions: How big is the universe? What does it look like? Are there more than nine planets in the Earth's solar system? Why and how is the universe expanding? What fills the space? Why does the world turn? What divides the universe and nothing? When will the world end? What are some theories? Can we control weather for other planets? How did the universe start? Are there aliens? Will we befriend extraterrestials? Are there life forms on other planets? Would all planets have life if they had enough time?



Barbara Brodhagen, Madison Metropolitan School District, Madison, Wisconsin

Figure 15

Knowledge and Skills Included in Outer Space Unit

Some of the knowledge and skills included in the integrated unit.

Language Arts

science fiction books and literature with space themes
research skills
report writing
story writing
oral presentations

Math

scientific notation
big numbers
ratios
measurement
problem-solving

Music

2001
"The Planets"
other music with space themes

Social Studies

maps—contour and topographical
space stations
famous space scientists
politics and space exploration

Science

eclipse
tide
scientific method
measuring with scales
constellations
astronomy
telescope
model building
planetarium
theories on the origin of the universe

Other

computer work
cooperative work groups

Barbara Brodhagen, Madison Metropolitan School District, Madison, Wisconsin

outcomes, so teachers involved in the project planned a variety of instructional activities throughout the year. They did this to ensure that students had opportunities to learn and demonstrate significant knowledge, skills, and concepts in a variety of ways. The two examples that follow show how this works in multidisciplinary and integrated units.

Olympia Brown Elementary School
Racine, Wisconsin

Kindergarten teachers Kathy Carson and Linda Haas focused on how teachers could create thematic units to better address student needs. Dissatisfied with the textbook approach, they developed thematic units to put content into a context that was more developmentally appropriate for children. "Fish" was chosen as the theme for the unit. Instead of addressing specific curricula related to separate subjects, the teachers used the Wisconsin Learner Outcomes to create activities that crossed all curricular areas. Below, Learner Outcomes are followed by an appraisal of each individual outcome. (Again, italicized comments are those of the teacher.)

Figure 16 ■

Wisconsin Learner Outcomes

The Department of Public Instruction endorses the following learner outcomes, which were developed by hundreds of educators and other community members from throughout the state. In order for students to demonstrate the outcomes, they will need a solid foundation in the academic subjects of language arts, mathematics, science, and social studies. The outcomes serve as a bridge between Wisconsin's Educational Goals, academic content, and student assessment.

1. Identify, develop, evaluate, and apply criteria to ideas, products, and performances of one's self or others.	This outcome requires students to be constructively critical of the work of other persons as well as that produced by one's self. A person should realize when such criticism is objective or subjective. Students should apply criteria developed by themselves as well as those developed by others.
2. Revise a product, performance, system, and idea in response to relevant information.	Relevant information might include additional data, changes in a situation, or feedback from experts, peers, or family members. Although the revision may make the item different than it was before, the intent is that the change results in improvement. The expectation is that students will consider all information presented and use that which will result in improvement.
3. Make informed decisions by examining options and anticipating consequences of actions.	Familiar sayings such as "look before you leap" and "think before you act" capture the essence of this outcome. Students should gather evidence and information relevant to some contemplated action, weigh the pros and cons of the potential results, and then choose the course of action.
4. Achieve desired results by interpreting and executing instructions, plans, models, and diagrams.	This means that students can follow directions in a variety of forms: written, spoken, pictorial, or represented as mathematical symbols. Following directions includes sorting things out when they are not clear as well as evaluating the successful attainment of the desired result. The actual result should be consistent with the intent of the direction-giver.
5. Recognize and devise systems and describe their interdependence.	A system is a set of elements that forms a unit or whole. Examples of systems include a musical composition, a game, a procedure designed to solve mathematics problems, weather, ecosystems, and monetary systems.
6. Create a quality product, process, and performance to meet a need.	This outcome is a tangible or visible thing or event. It includes paintings, musical performances and compositions, athletic performances, poems or essays, novels, or public policy.
7. Respond to the aesthetic and intellectual aspects of an event, performance, and product.	Although similar to outcome No. 6, this outcome focuses on a student's response to something someone else has done. Examples include an opinion, a critique, an essay, and a drawing.

8. Transfer learning from one context to another.	Students should identify similar characteristics of two or more situations, objects, or events. Often these characteristics are not apparent, so students need to be analytical. This outcome also involves finding a practical application for a theory and creating new uses for existing products and applications of ideas.
9. Recognize, define, and solve a problem.	This outcome focuses on situations that are problematic because the solution is not immediately obvious. The student needs to formulate the problem and eliminate irrelevant information. The effective problem solver uses a wide range of strategies and can often identify multiple solutions.
10. Recognize and communicate one's strategies for accomplishing objectives.	Students should reflect upon and explain their own thinking processes. Those approaches should be shared with others.
11. Work effectively in groups to accomplish a goal.	Throughout life—at school, within the family, at work—people must cooperate with others to effectively complete a task or project. This does not imply that working independently is not valued; independent working skills are also necessary.
12. Defend a position by combining information from multiple sources.	The position or point of view being defended could be one's own or that of another person or group. The position may be of a social, political, environmental, economic, or hypothetical nature. Students must gather information from a variety of sources and then blend that information with their own knowledge to create an argument in favor of a position.
13. Develop and test a hypothesis.	A hypothesis is a guess about a rule or relationship among a collection of events, objects, or ideas. Students should devise a plan to identify and collect data, then interpret and use those data to determine whether or not the guess is correct.
14. Recognize when a need for specific information exists and demonstrate the ability to locate, evaluate, and use the relevant information.	Students must be able to consult a recognized authority, to extract information from library sources, and to access electronic data bases. This outcome requires students to consider all information, eliminate that which is irrelevant, and then organize what is left into a usable form.
15. Conceive of places, times, and conditions different from one's own.	This outcome includes real as well as fictional places, times, and conditions. Students should think about life as it existed in the past as well as thinking about how it might be in the future.
16. Identify personal interests and goals and pursue them.	Students should work persistently over time on ideas, activities, projects, and goals that reflect their abilities, talents, and interests.
17. Recognize the influence of diverse cultural perspectives on human thought and behavior.	The term "culture" includes groups that share a common history or have a linguistic, racial, geographic, social, or occupational bond that may affect the way people act. Examples include the civilizations of ancient Greece; the Incan Empire; and Hispanic, African, or Asian cultures.

- Identify, develop, evaluate, and apply criteria to ideas, products, and performances of one's self or others.

Within the study of the ocean and creatures that lived in the ocean, we presented a challenge activity to our families to research any underwater animal, make a model of it, and send it to school to share and teach others. We had a response from 18 out of 33 families. The creatures were shared during a group activity time when classmates could ask questions about how each was constructed or why they had certain features. Students also created their own sea creatures independently, using classroom materials.

- Revise a product, performance, system, and idea in response to relevant information.

Based on information that the class had learned through shared reading, "show-and tell," and classroom research, we created our own version of a song that we had heard about fish. The song included underwater sea creatures and their movements. The class helped list many underwater creatures we had become familiar with and talked about how they moved about. This not only helped refine their understanding and identification of a particular group, but it helped classify similarities or point out differences and aided in vocabulary development. We performed the song for our parents in a culminating activity for the unit.

- Make informed decisions by examining options and anticipating consequences of actions.
- Achieve desired results by interpreting and executing instructions, plans, models, and diagrams.

We attempted to provide instruction using multiple modalities. We sang, we acted out stories and songs, we "interpreted" stories that were read and made them into our own versions, and we used video and audio presentations to inform ourselves and to compare information. We taught the class to recognize individual letters or to look for familiar words as we discussed and explored information. To facilitate memorization, we often used pictograms or rebus pictures when illustrating an idea or setting up a problem-solving activity.

- Recognize and devise systems and describe their interdependence.

We used song and drama to illustrate some of the knowledge the children had gathered from their exploration of fish and sea creatures. The song described sea creatures and their movements, addressed the likenesses and differences between them, and helped provide a vehicle for learning new vocabulary.

- Create a quality product, process, and performance to meet a need.

As a culminating activity, we demonstrated our knowledge by entertaining our families with two plays and a song. The plays were interpretations by the students of two fictional accounts of sea life. One story was about a beautiful fish who learned to share his scales with the other sea creatures. The other story was derived from an African folktale about why the sun and moon ended up in the sky. The song, created by students, was about sea animals and how they move in the water. We also decorated fish cookies, designing a "camouflage" to try to protect them from other sea animals that might prey on them. The children could be asked to tell why they were decorating a particular way (for example, the lines would blend with sea *grass, or the colors were similar to those of other plant material nearby, allowing the fish to blend in).*

- Respond to the aesthetic and intellectual aspects of an event, performance, and product.

We did not ask the children to respond to others in a critical manner. However, we could have requested more feedback when individual projects were being completed and shared, if the students could have done this in a positive manner. For example, we might have asked students "How would you add to what was created?" and " Can you draw a picture to show another student your plan?"

> *The child was so learned that he could name a horse in nine languages, so ignorant that he bought a cow to ride on.*
> *—Benjamin Franklin*

- Transfer learning from one context to another.

During "read-the-room" times, children were encouraged to share books, pictures, and other visual tools with each other, and to point out likenesses and differences. This also grew into a time to pick out "favorites" and ask "Why?" The group of "sharks" would gather with shark pictures and books and share things they had discovered, as did the "clown fish," "whales," and so forth. This information sharing could be extended to our discussions of camouflage (For example, we might ask "Which animals were predators and how can fish protect themselves?"), of food animals consumed, and of how we could set up a habitat in the classroom to keep our favorite fish alive.

- Recognize, define, and solve a problem.
- Recognize and communicate one's strategies for accomplishing objectives.

We tried to give opportunities for this during sharing time each day, when students could share their challenge projects or bring in "discoveries" or books. We also attempted this when we engaged in exploratory projects such as: "Why do animals look different? Why do animals have different shapes or move differently? and What do they eat?"

- Work effectively in groups to accomplish a goal.

Much of our activity took place within small and large groups. These activities included conducting various experiments using water, sink-float, and underwater habitats; constructing underwater creatures; creating puppet stories; acting out plays; and creating art projects (such as making fish kites or fish prints from a fish purchased at the fish market).

- Defend a position by combining information from multiple sources.
- Develop and test a hypothesis.

We challenged the students to create a boat that would hold plastic bears. Initially, we discussed construction materials, shape of the boat, and the position of bears as a large group. Then, the students could choose either to construct a boat independently, and test their hypothesis, or be a part of a large-group experiment to see what worked, what didn't work, and why.

- Recognize when a need for specific information exists and demonstrate the ability to locate, evaluate, and use the relevant information.

Children were asked to select a favorite sea creature and dictate a story about it and what they liked about it. Considerable informal, spontaneous discussion preceded the exercise during their "read-the-room" time, during which time students could choose any book to read. Many students attempted to convince others that the sea creature each selected was the "best because..."

The class made a collection (from home, library, and within the class-

room) of sources for information. We had just introduced the dictionary to the kindergartners as way to look for words that started the same way. This carried over to the resources (pictures, books, models, and games with pictures or stories) that we collected and stored in an accessible area. All were encouraged to add to the collection with ideas from home or from trips to the library.

- Conceive of places, times, and conditions different from one's own.

Each child was asked to choose a sea creature each could imagine being. Each child created a story, illustration, song, or puppet story about themselves. Many were able to do research by asking for help to find out about their particular animal. Some took their ideas from the stories we read daily about various animals.

- Identify personal interests and goals and pursue them.

The challenge activities and the story illustrations were left to the students (and their families in the case of the challenges) to decide what form of expression their ideas would take. There was tremendous variety in the way in which they presented their ideas. We found it amazing that kindergartners were either coming up with the ideas by themselves or engaging in some type of research together with their families (or in the classroom) to pull together ideas to show the class. We were so impressed with the results that we decided to enter the display in our annual district science fair. The class project earned a ribbon for creativity and discovery.

"We found it amazing that kindergartners were coming up with the ideas by themselves."

- Recognize the influence of diverse cultural perspectives on human thought and behavior.

The cultural perspective was something that we did not bring into our general discussion as a topic itself. However, we tried to lay the groundwork for thinking as "a member of a group" when we asked the students to imagine being part of a school of fish, or to talk about a story we read in which fish learn that cooperative behavior helps them ward off predator fish. We also encouraged them to think about the likenesses and differences between the varieties of sea creatures, noting the strengths, as in "What keeps these animals alive?" and whether there was something about this fish (such as its camouflage, swimming in schools, ability to blend into environment, size, or teeth) that protects it?

Oconomowoc High School
Oconomowoc, Wisconsin

Julie Mason and June Casey taught an integrated rhetoric/world history class (formerly English, speech, world history) to sophomore students. Their project shows how students can experience a wide range of activities as they achieve learner outcomes. Use of the Learner Outcomes helped the teachers ensure that student work would be both rigorous and comprehensive and that the connected curriculum project addressed required content.

- **Revise a product, performance, system, and idea in response to relevant information.**

Writing assignments focused on the process of revising a product in response to relevant information, including feedback from the teacher and peer editing.

- Achieve desired results by interpreting and executing instructions, plans, models, and diagrams.

Students were asked to interpret and execute instructions for giving different types of speeches and presentations. They also designed plans and constructed models.

- Recognize and devise systems and describe their interdependence.

In their comments on heterogeneous grouping, students recognized their interdependence with other students while working in groups.

- Create a quality product, process, and performance to meet a need.

Students were encouraged and supported in their efforts to create quality projects, such as a Greek tableau museum, which was open to the entire school for viewing. They also produced and performed scenes from plays.

- Respond to the aesthetic and intellectual aspects of an event, performance, and product.

Students went to numerous performances and were asked to respond to questions relating to aesthetic and intellectual aspects of those performances.

- Transfer learning from one context to another.

Because of the integrated nature of the content of the courses, transfer in learning occurred automatically when reading or when learning strategies for glossing and mapping were applied in English class to the world history text.

- Recognize, define, and solve a problem.

In the course of constructing their projects, students encountered many problems needing solutions.

- Recognize and communicate one's strategies for accomplishing objectives.

In their reading logs, students were asked directly to recognize and communicate their thoughts, questions, and strategies for accomplishing the objective of understanding and summarizing the material they were reading.

- Work effectively in groups to accomplish a goal.

Student surveys indicate that students often formed groups to work on projects and performances and to hold discussions.

- Defend a position by combining information from multiple sources.

Some students wrote "I-Search" papers that required multiple sources.

- Develop and test a hypothesis.

The "I-Search" papers required the investigation of a historical question devised by each student.

- Recognize when a need for specific information exists and demonstrate the ability to locate, evaluate, and use relevant information.

Students were required to locate information, evaluate it, and use it when they constructed a Greek theater. They also did this when creating a museum at the end of the second semester.

- Conceive of places, times, and conditions different from one's own.

The study of world history and the timelines used for the integrated curriculum helped students learn from times in the past. Students got involved in recreating events from various times, including ancient Greece and Rome.

- Identify personal interests and goals and pursue them.

Students were able to explore their own interests, multiple intelligences, learning styles, and goals by having choices in how they presented evidence of their learning.

- Recognize the influence of diverse cultural perspectives on human thought and behavior.

Conversations about readings in all three classes revolved around the influence of diverse cultural perspectives on human thought and behavior.

Content and Standards in a Connected Curriculum

Several teachers involved in connecting the curriculum conducted action research on standards and connected curriculum. Following is a brief report of their experiences.

Olympia Brown Elementary School
Kenosha, Wisconsin

Kindergarten teachers Katherine B. Carson and Linda Haas say the following about their experiences with a connected curriculum:

We are absolutely sold on this style of teaching. It gives us the flexibility to meet the needs of a very broad range of abilities in students, and it tickles the children's interest. We are constantly relying on them to provide us with input as to what or how we will study something.

We've discovered that this is a tremendous amount of work. Despite the effort we've put into each web creation, we change it to meet the needs and the interests of each class. But I don't think any of us would give up this type of curriculum organization. We can cover a lot more content in a shorter period of time. The children are learning far more with our thematic approach to teaching than with a separate subject, textbook-driven curriculum.

We feel this is a very efficient way to teach. We've also found ways to integrate assessment into the activities. We love doing this as much as we hope our children are learning to love school.

"The children are learning far more with our thematic approach to teaching."

Randall Elementary School
Waukesha, Wisconsin

Fifth-grade teachers Mary Bader and Tim McCarthy report:

We believe ridding ourselves of the artificial divisions between subject areas and focusing on how skills and concepts from all areas work together will make teaching more efficient. Because the skills and concepts from different subject areas are often the same or similar, reorganizing them so that complementary outcomes can be taught together will save planning time. We also believe that more can be taught in the same amount of time. Just one example of the reason for this is that less time will be wasted in reintroducing similar skills in different subject lessons. The time needed for so called "anticipatory sets" will certainly be reduced when students directly experience the connections between skills and concepts within integrated units.

Einstein Middle School
Appleton, Wisconsin

According to seventh-grade teacher Michelle Froehlke,

Standards are not a book of rules to follow; they can't spell out and measure the feeling and the heart that goes into teaching and learning. Instead they are a guide and check system. If teachers are doing their job and care about education and kids, teachers are already meeting most of the standards. The standards could, in that case, be used as insurance that what the teacher is doing is appropriate.

I see a need to create integrated standards. When reading the English and social studies standards, I saw many overlapping standards, and I am sure there are many areas that can complement one another.

Madison Junior High School
Appleton, Wisconsin

"I have gone from being a ninth-grade social studies teacher to being a ninth-grade teacher."

Mark Leschke, a ninth-grade teacher writes that

I was introduced to standards work through CTC. The project brought together people from different disciplines and we saw how connections could take place. It also forced me to look at how what I was doing in the classroom fit into a national and state perspective. My work has forced me to look at the entire ninth grade and to find ways to fit instruction together. I have gone from being a ninth-grade social studies teacher to being a ninth-grade teacher. Standards, CTC, and my assessment work have produced an evolution in me that does not allow me to think of myself only as a content specific teacher. This, I would argue, is also good, although I continue to be frustrated with finding a way to explain to parents what we do, how we do it, and why it is important to us. It is possible that the standards movement will facilitate such communication.

Tainter School
Rice Lake, Wisconsin

Third-grade teacher Ava Schwartz notes that

Until we developed the integrated farming unit, the national standards and the Wisconsin Learner Outcomes were not very familiar to us. We had been guided by textbooks, but when we taught our integrated unit, the transitions between subjects were flowing rather than being disjointed. Also, more time was available to present ideas and concepts because we were not restricted to a specific number of minutes per subject. Also, we found that we created more hands-on learning experience and educational activities that were authentic and meaningful to the students. For example, the math component went beyond learning concepts: students experienced how math is used outside of a school setting, through social studies, reading, and science lessons.

National standards should not dictate curriculum, but give it a sense of direction. Teachers who plan connected curricula are no longer tied to textbooks, which means it is more difficult, but more necessary, for them to consider standards. Many teachers planning connected curricula indicated they use standards after the fact to review what content was included and to determine what standards needed to be addressed in other themes, topics, or units for the rest of the school year.

Teachers in the project consider standards to be general principles that they could use to work in broader contexts and make more connections. Teachers found standards useful to inform them and serve as guidelines about what students should learn. One teacher notes that even though she did not consciously consider standards from the start, her students wound up meeting a number of them in the course of the project. This shows that a connected curriculum can help teachers and students alike meet challenging educational standards.

Teachers find that the ability of students to understand and retain content increases as more and more curriculum connections are made. Teachers also say that students who experience real-life activities as a component of their school instruction improve their decision-making abilities and develop deeper and broader understandings of what they are studying. As teacher Amy McClellan notes:

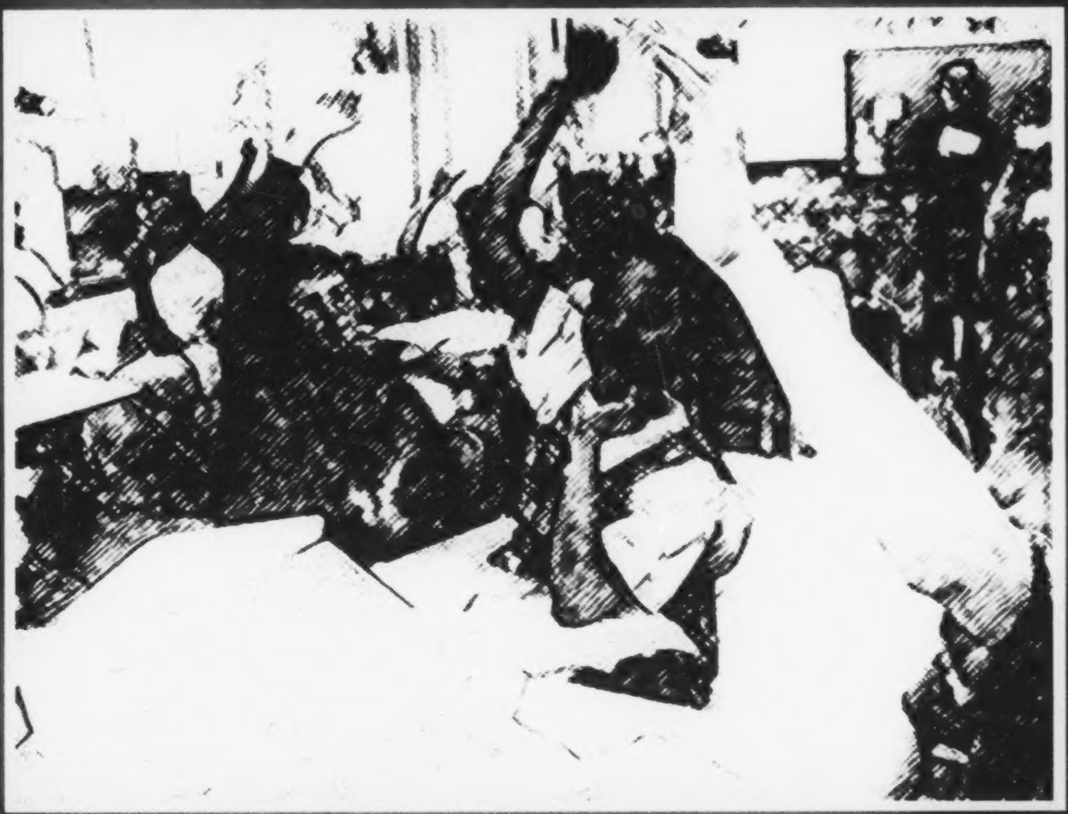
> *There are many ways I determine the success of my teaching. When I see my students enthused, active, and involved in their work, I feel successful. When my students apply what they've learned to another situation and are able to articulate how they have improved, I feel successful. When students are proud of their work, when they show it to their peers and explain the process of their accomplishment, I feel successful.*

"When I see my students enthused, active, and involved in their work, I feel successful."

References

Brodhagen, Barbara. "The Situation Made Us Special," in *Democratic Schools*. Alexandria, VA: Association for Supervision and Curriculum Development, 1995.

4



BEST COPY AVAILABLE

Introduction

Action research is a tool to improve the way teachers work and perform tasks, or to obtain knowledge or new skills. Many teachers planning connected curriculum have found that action research is the best way to investigate how they think about, design, and deliver connected curriculum.

There is a long tradition behind teacher action research. Several historical accounts of action research trace its beginnings to the early 1900s, a time when attempts were being made to apply the scientific method to education. John Dewey, one of America's most renowned progressive educators and educational philosophers, advocated integrated and reflective teaching. Dewey argued that teachers should be as questioning about their own worlds as are their students. On the subject of teachers as researchers, Dewey said, "It is impossible to see how there can be an adequate flow of subject matter to set and control the problems investigators deal with, unless there is active participation on the part of those directly engaged in teaching" (1929).

During the middle of the 20th century, Kurt Lewin, a noted American social psychologist, advanced the acceptance of this important process of inquiry. He was the first to use the term "action research," which he defined as a method of experimental inquiry. His view was that social problems should be the focus of social science research. Lewin and other social psychologists with similar beliefs worked hard to adopt methods of social science that would enable them to play a more active role in addressing problems of racism and poverty. They stressed that the researcher and community members work side by side to study the problems; collect needed facts; conceptualize, plan, and implement the action; and, finally, evaluate their efforts. Lewin used action research to help minorities deal with social and psychological problems caused by racism and prejudice.

Action research takes place when teachers systematically and intentionally inquire into and reflect about their teaching practices...

Teachers embraced this exciting, collaborative form of research. Educators from the university and local school levels began to collaborate in this new form of research. In the 1950s, Stephen Corey and Hilda Taba conducted curriculum projects dealing with the same kind of social issues Lewin addressed in the community setting. Corey believed that teachers who performed their own research would be more likely to change existing classroom practices because the changes would be a direct result of what they learned.

How It Works

Action research takes place when teachers systematically and intentionally inquire into and reflect about their teaching practices over a period of time (see figure 17). (This process is also known as teacher research, teacher inquiry, or practitioner research.) Action research generally includes the following steps:

- Frame the focus of research.
- Make a preliminary plan on how to accomplish research goals.
- Implement the plan.
- Observe and collect data.
- Analyze observations and data and reflect on results.
- Repeat the process.

Figure 17

Teacher Researchers

What Do Teacher Researchers Do?

Teacher researchers

- develop research questions based on their own curiosity about teaching and learning in their classrooms.
- examine their underlying assumptions about teaching and learning.
- systematically collect data from and with their students.
- share and discuss their data and research methodology with fellow teacher researchers.
- analyze and interpret their data with the support of fellow teacher researchers.
- write about their research.
- share their findings with students, colleagues, and members of the educational community.
- discuss with colleagues relationships among practice, theory, and research.
- assume responsibility for their own professional growth.

What are Some Effects of Teacher Researcher Projects

Some effects are

- increased sharing and collaboration across departments, disciplines, and grade levels.
- increased dialogue about instructional issues and student learning, enhanced communication between teachers and students.
- improved performance by students.
- revision of practice based on new knowledge about teaching and learning.
- teacher-designed and initiated staff development.
- development of priorities for schoolwide planning and assessment efforts, contributions to the profession's body of knowledge about teaching and learning.

Office of Educational Planning Services, Fairfax County Public Schools, Fairfax County, Virginia.

Frame the Focus of Research

The individual teachers or team of teachers can start by deciding what issue will be the focus of their action research. In trying to frame their research questions, action researchers start with broad-based concerns such as:

- How can I help my students to learn more and improve their grades?
- What factors in my classroom support improved student achievement?
- How can I determine what teaching behaviors improve student achievement?

There cannot be a precise answer to a vague question.
—Samuel Johnson

Teachers can review what is already known about the issues before considering local factors concerning issues in their own classrooms. These might include such variables as student backgrounds and learning levels, school district philosophy and standards, and the teacher's own educational background and experience. Figure 18 shows other types of questions that will help teachers narrow their focus so they can choose an action research question that is meaningful for them and will lead to improved learning opportunities for their students.

Figure 18

Developing a Focus for Action Research

Considerations

Language
Is the question clear and easily understandable?
Does it avoid a "yes" or "no" response?
Does it link teacher performance with student performance?
Does it avoid educational jargon?

Intent
Is it realistically achievable considering the time and resources available?
Does it fit with what and how you teach?
Is it aimed at improving what you do in the classroom?
Is the topic important?

Research
Can you identify more than one kind of data to help you answer the question?
Can the question be measured and/or evaluated?
How much and what kind of data will you need to produce a valid answer?
Will answering the question have practical value?

Commitment
Is the issue very important to you?
What impact does it have on your teaching?
Do you really want the answer?
Will the action research make any difference in the way you teach?

Make a Preliminary Plan on How to Accomplish Research Goals

Once the issue has been determined, the next step is to figure out how to address it. Several issues need to be considered in mapping out an action research plan. Action researchers decide which students and teachers should be involved in the project; what content resources are needed; what training teachers might require; what equipment or materials may be necessary; and whether students themselves need some type of preparation to adapt to new learning methods or to perform new types of classroom assignments.

Teachers will want to consider what means of data collection will provide the best information and how results will be shared with other educators. A timeline, with time set aside for planning and classroom preparation, will help in the planning process. Time can be saved by trying to foresee possible problems that may come up during the course of research.

Implement the Plan

One of the first things teachers should do in implementing their plan is inform school administrators and parents about the action research project and seek their cooperation. School administrators can provide support in making class or schedule changes, ensuring that teachers have adequate time to plan for new types of learning activities, and in dealing with other issues that may arise. Parents, and possibly other community members, should be informed how such projects will affect and help improve student learning.

Flexibility is important during implementation because research does not always go smoothly. Some teachers may alter or entirely change the focus of their question once action research has begun. They may revise how they want to collect data, change their timelines, add new classroom activities, or make many other changes as needed. Action research is, in effect, a cycle of learning. As it proceeds, the action researcher will not only learn about the issue he or she is investigating, but also about how to perform action research.

Observe and Collect Data

One of the most difficult decisions in action research lies in choosing the types of data that will be relevant. Figure 19 suggests possible data collection tools. Consider the following example for researching the question "What teaching behaviors have the greatest connection to increased student achievement in my class?"

The teacher might make a list that identifies instructional strategies he or she uses and then start a chart or journal to keep track of how often and in what circumstances they occur. Surveys or checklists might elicit responses from students or parents about how they feel about the new teaching methods. If students and parents indicate that certain teaching strategies are effective in helping their children learn, the teacher can increase his or her use of that strategy. Test results for those lessons might be evaluated to determine if they are more successful and to show the link between the teaching strategies and student achievement. Most action research practitioners suggest using at least three techniques to collect data. Teachers may have trouble finding time during the school day to record data, but unless action researchers pay attention to this vital task, important data can be lost. Time should be set aside to allow for collecting the information by whatever means is chosen.

> *A good question is never answered. It is not a bolt to be tightened into place but a seed toward the hope of greening the landscape of ideas.*
> *—John Ciardi*

■ Figure 19

Data Collection Tools for Teacher Action Research

- Attendance records
- Audiotapes
- Case studies
- Checklists
- Diaries/journals
- Disciplinary referrals
- Field notes
- Focus groups
- Follow-up studies
- Individual files
- Interviews
- Logs
- Observations
- Photographs
- Portfolios
- Pupil/teacher interviews
- Questionnaires
- Surveys
- Test scores
- Time on task studies
- Videotapes
- Work samples

Analyze Observations and Data and Reflect on Results

By analyzing the data, researchers can gain insights into their research issue. In many cases, expected patterns or trends become apparent, theories are confirmed, and beliefs about learning and teaching are reinforced. The answers that arise out of action research, however, are not always expected. Surprising, confusing, or conflicting data may lead teachers to develop a subsequent action research question to continue their investigation of the issue. This is a natural result of action research, because this process recognizes that learning is ongoing. A powerful result of shared action research is the continuing impetus it gives to developing, understanding, and adopting teaching behaviors and classroom practices that improve student learning.

Results of action research should be shared with other teachers as well as parents, students, and other community members. Researchers can compose a written report, talk formally or informally with their colleagues about their experience, invite parents into their schools to examine aspects of the action research process, or share a videotape to illustrate their research activities.

Repeat the Process

In the final step, the teacher researcher redefines the original issue or develops a new focus based upon data, observation, and reflection. The researcher will then repeat the process to create a cycle of continuous improvement. In this cycle, each step leads to more knowledge about what is being studied and about the action research process itself. In researching one question, teachers may find three other questions they want to pursue. They may discover something about teaching and learning that will lead them to new areas of research. Or the teacher may come up with part of the answer, and decide to return to the original research topic in order to further his or her knowledge of the original topic. This continuous nature of the action research process makes it a good tool for teachers who want to continue to improve their teaching effectiveness.

What Action Research Does

Many teachers have found action research to be extremely valuable. Involvement in the action research process can help teachers boost their confidence as teachers, enable them to realize their classroom aspirations, develop a deeper understanding of their classroom practices, and teach them how to continue to learn about the way they teach so they can improve over time (Zeichner, 1994). There is also evidence that action research promotes classrooms that are learner-centered and inquiry oriented, because teachers tend to give their students similar opportunities to learn (Cochran-Smith and Lytle, 1993). In *Reclaiming the Classroom: Teacher Research as an Agency for Change*, Goswami and Stillman summarize their observations on what happens when teachers conduct research as a regular part of the way they teach.

Action research promotes classrooms that are learner-centered and inquiry oriented.

- Their teaching is transformed in important ways: they become theorists, articulating their intentions, testing their assumptions, and finding connections with practice.
- Their perceptions of themselves as writers and teachers are transformed. They step up their use of resources, they form networks, and they become more active professionally.
- They become rich resources who provide the profession with new information. They can observe closely, over long periods of time, with special insights and knowledge. Teachers know their classrooms and students in ways that others can't.
- They become critical, responsive readers and users of current research, less apt to accept uncritically others' theories, less vulnerable to fads, and more authoritative in their assessment of curricula, methods, and materials.
- They can conduct research and report their findings without spending large sums of money (although they deserve support and recognition). Their studies, while probably not definitive, taken together help teachers develop and assess curricula in ways that are outside the scope of specialists and external evaluators.
- They collaborate with their students to answer questions important to both, drawing on community resources in new and unexpected ways. The nature of classroom discourse changes when inquiry begins. Working with teachers to answer real questions provides students with intrinsic motivation for talking, reading, and writing and has the potential for helping them achieve new skills.

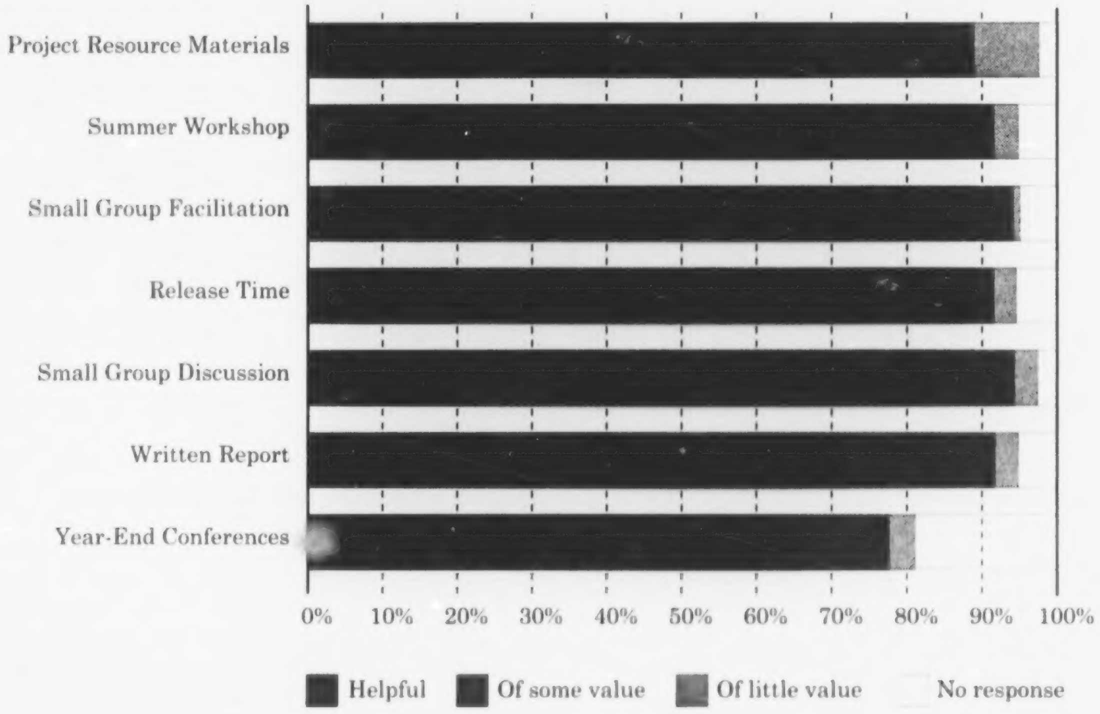
Although it offers many rewards for both teachers and their students, action research requires a variety of support. The following factors will help support teachers who are doing action research:

- Substitute leave time, teaching assistants, a schedule that allows time for research, and/or reimbursed hours beyond contract for researchers to support each other as they analyze and interpret data and discuss and write about their findings.
- An experienced teacher researcher to guide and support researchers through the process, linking them with related research, methodologies, and other researchers.
- Recognition and tangible evidence that the work and findings of teacher researchers are valued; use of the findings in planning, assessment, and instructional decision-making.
- Clerical assistance with word-processing, printing, and binding of research (Fairfax County Public Schools).

Participants in an action research course were asked to comment on the value of action research components such as resource materials, release time, small group meetings, and so forth. Figure 20 lists their responses. As shown, release time from teaching is viewed as an important factor in conducting ongoing action research. Small group discussions and the role of

■ Figure 20

Action Research Support Factors



Fairfax County Public Schools, Fairfax County, Virginia.

facilitation are also very highly rated. Those who were not able to continue their action research process had the following comments:

- *Let's keep this going, if possible! I felt a little lost or lonely without much contact or info about CTC this year!*
- *Due to the time factor and the lack of administrative support, it was impossible to do action research this year. However, I continue to be very interested in this type of research and hope to conduct action research again.*
- *The time and structure provided by this project last year were paramount to my accomplishments.*
- *Great concept. Would have liked a specific mentor and monthly meetings this year.*
- *My experience with this project in 1994-95 was the highlight of my professional career, to date. I wish I could be on a team every year. I miss that level of teaching and learning.*

Examples of Action Research

This section will give the reader insight into how some educators worked through the action research process. Their comments and experiences, in their own words, are listed under each step of the action research model.

Team-teaching English and History

The first example is taken from Jim Jeffries, a teacher at Eau Claire North High School.

Frame the Focus of Research

My original purpose in participating in the project was to help create a new humanities course with two other teachers. This project was especially exciting to me because I believe that history cannot be taught in isolation. You need to understand the art, music, and literature of each era to fully understand the history. I asked the question "What would happen to course content, as well as student interest, motivation, and achievement in a connected class?"

Make a Preliminary Plan on How to Accomplish Research Goals

Even after we agreed upon themes, there was still a great deal of disagreement over how the course would be taught. One teacher had a conflict with how much time it would take from her other classes. She eventually dropped out and I had to find another teacher. The Work Experience, Career Exploration Program teacher Tom Kuklinski, was the perfect choice. Tom teaches the English class in this program and I teach the US history class. We both teach this class the first two hours of the day and we both have the same students. This made it ideal for integration. We got together for about ten hours over the summer to compare our curricula and started out the year in an integrated class.

Implement the Plan

We learned from each other's strengths. I taught Tom how to use more humor in his teaching. Tom taught me how to work through problems with students without becoming confrontational. We learned much, much more since we each had different strengths. Showing students that their skills were applicable in all classes made us a strong teacher-team.

Observe and Collect Data

The next lesson we taught was the five-paragraph essay. We both taught the writing process using students' life stories as examples. Then we went to the computer lab to do a five-paragraph essay on slavery. The students were focused and worked hard, which is unusual for a dry assignment such as this. The two main reasons for this is that the weight of the assignment was doubled, since it went to both English and history, and we had two teachers monitoring. Still, we could tell that the students were not very self-motivated.

Analyze Observations and Data and Reflect on Results

On the next unit, we had the students research famous Revolutionary War leaders. Once again we went to the computer lab to write a report. To add interest, we also had our students take the role of the figure they wrote about and give a speech to the rest of the class. At the end of the first semester, we did not want to give a final exam. Instead, we had our students do a final project. They had to write an historical short story. To increase interest, we told them to include themselves in the story. They were to pretend that they lived at that time and react to events occurring around them. The events described had to be significant and historically accurate. They were graded on mechanics, creativity, and historical content. The students demonstrated mastery of skills and content taught throughout the semester with this project. We were quite pleased.

Our final combined class of the year will be a project. Students, in groups of three, will write, direct, produce sets for, and act in an historical play. This will give them an opportunity to apply the knowledge they gained this semester in a creative way.

My experience in integration was very rewarding. I learned many teaching strategies from my colleague, which made me a better teacher. Student interest was much higher during integrated units. Student grades and turn-in rate on assignments were much higher as well. I would welcome the opportunity to integrate my other history classes with English, or any other discipline, but scheduling conflicts prevent this on a regular basis. Perhaps, if our schools do restructure, I will have more opportunities.

"My experience in integration was very rewarding. Student interest was much higher during integrated units."

Repeat the Process

After three other integrated projects, we combined to do a unit on immigration involving simulations of the Ellis Island processing center. This simulation was our most successful. Our students achieved cognitive learning through their research and writing, and they achieved affective learning through their role-playing. Students who were studying French got to practice conversational French in a very interesting setting. In their evaluation of the simulation, our students said that it was the most they had learned all year.

Trolls Teach Diversity

The notes of Donna Walther, a teacher at Pedersen Elementary School in Altoona, Wisconsin, provide another example of the action research process and how the steps repeat and refine what is learned. The dates provide an illustration of how long the action research process can take.

Frame the Focus of Research

October 18 meeting. I've decided that most of my time will be spent researching and teaching a unit about diversity. I'm also hoping to do a better job of assessment.

Make a Preliminary Plan on How to Accomplish Research Goals

I spent two hours at a Scandinavian shop. I talked with the owner and gathered some valuable knowledge about the art of Norway. I think I will develop a unit about trolls. They are fascinating creatures. A unit about trolls will meet the curriculum objectives.

About four hours spent searching for and reading troll information at the area libraries. I found some interesting stories about trolls. I have a good idea now of what the art project for the diversity unit will be.

Implement the Plan

I have started teaching the architectural diversity unit. This unit has been taught in the past but I have made revisions to emphasize diversity.

November 15 meeting. The morning was spent discussing integration ideas with the five fourth-grade teachers and the music, learning media, and phy ed specialists. It was a morning of great excitement and frustration. We listed content areas in each of our disciplines. Each discipline representative then displayed the lists so that all could look them over and find some connected areas (see figure 21). We

Figure 21

Discipline Connections

Art

Birch bark baskets
Noisemakers or dreamcatchers
Victorian architecture
Art glass
Local architecture
Fiber arts
Masks
Papermaking
Perspective drawings
Trolls and rosmaling
Paintings

LMC

Research
—Animal research project
—Magazines
—Encyclopedia
—Atlas
Biography of author
Fairy, folk tales, and tall tales
Critical TV viewing
Organization of resources
—Dewey decimal
—Fiction vs. nonfiction
Computer resources
Copyright

Music

Native American music
Recorders
Reading music (naming notes, staff, and time signature)
Form (patterns in music)
Composers
Melody
Tone color
Harmony
Rhythm, counting, patterns
Texture
Instruments of the orchestra
Singing skills
Movement (dance to music)
Folk songs

Social Studies and Language Arts

Native Americans
Explorers
Immigrants (traditions)
Literature
Lumbering
Manufacturing (Wisconsin industry)
—Inventions
Dairy
Government
Maps, globes, cities

Physical Education

Aerobic fitness
Wellness
Physical fitness testing
Rhythms (folk dancing, square dancing, social dancing/games)
Muscles/bones
Circulatory/respiratory system, heart/pulse
Sport skills
Timing—stopwatch
Throwing, catching, rolling
Rope jumping
Rope climbing/tumbling

Math

Problem-solving strategies
Act it out?
Guess and check?
Make a table
Make a graph
Look for a pattern
Work backward
Make an organized list

Process: add, subtract, multiply, divide
Geometry
Measurement
Money
Logo writer?
Lego/logo?
Place value
Fractions
Decimals
Estimation

Science

Weather/climate
Atmosphere/air
Electricity/magnets
Human body systems/hygiene (digestive, skeletal, muscular, respiratory)
Ecology
Geology (rocks, minerals, landforms, weathering)
Nutrition

Pedersen Elementary School, Altoona, Wisconsin.

all found connections with other disciplines. This took a lot longer than I felt it should have. However, I have to remind myself that most of the teachers are only now learning about connecting the curriculum. I'm glad to have Linda, another teacher, working with me as we will move forward while the others catch up.

Linda and I have decided that students will write about trolls in language art classes. She will be reading troll stories to the students to help them gain an understanding of the culture. I have started making posters for teaching the troll lesson. We have decided that the trolls students choose to make and write about will teach some kind of valuable lesson. The students will look to their own personal experiences for developing this idea.

December 12 meeting. We have work time. I have begun writing objectives and the lesson plan for the troll project. The troll unit will begin the week before Christmas vacation. Until then students will be working on the architectural diversity lesson. I hope to give students all the information needed so that they may develop thoughts about their trolls over vacation.

Students are extremely excited about the troll lesson. Many students asked if they could work on it over winter vacation. No problem!

Observe and Collect Data

January 16 meeting. Much of January was spent typing and pulling the unit together. We are midway through the troll lesson. Many students started their trolls at home over vacation. Students are flying with this lesson at about 200 miles an hour. I was only prepared to teach it at 100 miles per hour. The enthusiasm is great and the lessons their trolls will teach sound terrific! Amazing how the more terrible their troll can be, the more thrilled the students are!

Linda had a chance to talk with the other fourth-grade teachers and it has been enthusiastically decided that all fourth-grade students will write about their trolls in language arts class. This will save me some time as I had planned to have them write in art class if the other teachers did not want to work with students on this.

Analyze Observations and Data and Reflect on Results

The instructional strategy that we used to connect the curriculum was the webbed model. This model was not one we had sought out but rather came up naturally. The webbed model of integration views the curriculum through a telescope, capturing an entire constellation of disciplines at once. This conceptual theme of diversity provided many possibilities for the various disciplines. The topic, Wisconsin immigrants, was used to help organize our curriculum thematically, working with all fourth-grade teachers and specialists to develop a valid connected curriculum (see figure 21).

Linda and I have worked together many hours outside of the school day as we needed to progress with our unit. I am pleased with the work that was accomplished through this action research project. I am also aware of the work yet to be completed. I will continue to work at connecting the curriculum and look forward to it. It involves a lot of time, energy, and commitment, but kids are worth it!

Assessment involves several steps. I believe the first, very important, step is making sure I'm teaching students what they should know and be able to do. In order to do that I need to consider the national and state standards, district goals, and specific grade-level curricula. I need time to discuss what is actually being taught by the teachers in each of the grade levels. At times I have been frustrated as it has been difficult to pull all of these elements together. But because Linda has been willing to work with me, I have a much better understanding of the fourth-grade curriculum.

At this point I do not have good written data documenting my assessment. What I do have is notes jotted down through this process. I also have some wonderful projects from students that do show that the objectives are being learned. Just how these results will be used, I am not sure yet.

As we have continued to connect our curriculums I have made some general assessment observations. The three units that we have connected have covered content areas in much more depth. I think this makes learning and teaching much more fun. I feel like I'm doing a much better job teaching the art objectives because much of the background information I would have spent teaching is now being taught in social studies. I have also noticed a positive change in the attitudes of students. The enthusiasm and desire to put in extra time (noon hours and after school) by a large number of students has been exhausting but rewarding.

Repeat the Process

The observations that I have made need to be documented. This is one of my top goals as I continue to connect the curriculum in our district. I have no intention of stopping when this project is finished. I believe that this kind of teaching is what's best for kids and students, and I will continue to work hard to prove it.

I believe that this kind of teaching is what's best for kids and students, and I will continue to work hard to prove it.

Supporting Action Research

The third example comes from Sally Habanek, staff development coordinator for the Cooperative Education Services Agency, Region 1, and Debra Taylor, director of instructional services. Their experiences provide information on how the action research process applies to educators outside of the classroom.

Frame the Focus of Research

Interest in this project stemmed from the need to develop greater understanding of action research processes, staff development inquiry methods, and integrated curriculum. Our purpose was to improve our ability to support, guide, and facilitate curriculum integration and action research efforts in area schools. Our research question became "What professional development practices support the implementation of integrated curriculum?"

Make a Preliminary Plan on How to Accomplish Research Goals

We utilized research information from a variety of resources. Since neither of us had daily access to a classroom, the study was constructed around interviews of teams of teachers in two settings, an urban elementary school (hereafter referred to as site A) and two suburban secondary schools (hereafter referred to as sites B and C).

Implement the Plan and Observe and Collect Data

Interviews occurred with four teams. The investigators developed questions to guide the interview process. Interview participants were taped and the tapes were transcribed and coded. Three themes emerged during the coding process: depth of curriculum integration, nature of professional development, and impact of collegial relationships.

Analyze Observations and Data and Reflect on Results

Site A: The interviews inform the research question in three ways. First, we were able to draw conclusions about the nature of the integrated curriculum practices through teacher description. Second, the impact of teacher collegial relationships was identified through the conversations. Third, the role of professional development on these was conspicuous in its presence in the elementary school and its absence in the high school. Teachers' success was contingent upon positive collegial relationships within and among team members as materials were shared, ideas were exchanged, and support was provided.

Sites B and C: Analysis showed a simple format for making connections between the two curricula. Teachers of both teams identified natural connections between the content areas based on a chronological or thematic basis in history and literature. Additional linkages were made based on discussion and reflection by the teams as to the specific student skills needed by one or the other teachers. This occasionally resulted in exchange of curriculum content.

Since teachers at the high school level had not received any formal training on integrating curriculum, their interpersonal relationships served as the conduit for improved teacher practice. Through reflection and discussion about their successes or failures, revisions and new directions were developed.

Analysis of the site interview data points to several key issues to consider in the process of integrating curriculum at any instructional level. In both settings, the central factor contributing to success was the interpersonal relationships between the teachers themselves. Friendships fostered good, equitable working relationships, which in turn helped teachers develop into highly flexible teams.

A second conclusion might possibly be drawn to reflect the depth of integration in relationship to prior knowledge and exposure to curriculum integration theory. With a stronger background, teams more readily integrate curriculum in a greater variety of forms that foster a greater depth of authentic knowledge on the part of the student.

Repeat the Process

Further questions posed from this research might inquire into the differing effects of context or organizational culture on integrating curriculum. Several factors from the study would support a hypothesis that, due to contextual differences, slightly different formats of professional development might be more successful at one level or another.

References

Cochran-Smith, Marilyn and Susan Lytle. *Teacher Research and Educational Knowledge.* New York: Teachers College Press, 1993.

Goswami, Dixie, and Peter Stillman, eds. *Reclaiming the Classroom: Teacher Research as an Agency for Change.* Portsmouth, NH: Heineman, 1987.

Zeichner, Ken. "Personal Renewal and Social Reconstruction Through Teacher Research." In *Teacher Research and Educational Reform.* Sam Hollinsworth and Hugh Sockett, eds. Chicago: University of Chicago, 1994.

Connected Curriculum and Action Research Stories

5

Connected Curriculum Frameworks
Assessment
Equity and Community

BEST COPY AVAILABLE

Connected Curriculum Frameworks

This chapter focuses on reflections by teacher researchers on connected curriculum frameworks, assessment strategies, community connections, and equity. (A synopsis of a portion of the action research projects conducted by project participants can be found in the appendix.) The majority of participants selected the multidisciplinary method to connect curricula, with most others choosing the integrated approach. There were also some projects that fused two or more separate courses to create a new course. This chapter gives examples of how teachers used these various techniques to connect curricula for their students.

Multidisciplinary

In the multidisciplinary approach, connections in the curriculum are considered through the lenses of multiple school subjects. For example, the focus of a unit might be the European settlement of Wisconsin. A teacher or team of teachers would look into existing subjects to determine what knowledge or skills from each could be applied to the topic. They would then plan the unit to take advantage of these connections between the subjects involved. This model can incorporate as few as two subjects and possibly many more.

A project at Tainter Elementary School in Rice Lake, Wisconsin, called "The Farming Link" was designed by teachers Dianne Barkley, Ava Schwartz, and Kim Timmers using the multidisciplinary connected curriculum framework.

Initially we thought of using Charlotte's Web *as the basis of our theme. Then we considered a broader theme of the farm using* Charlotte's Web *as the reading component of our project. After we started our project, our focus shifted to community involvement and the community's interrelationships with the farming community. Our farming unit was fully integrated in our third-grade classrooms for three weeks. Each subject's activities related to the farming theme, including reading, writing, drama, art, physical education, science, social studies, and math.*

The teachers gave their students many opportunities to see connections across subjects. For instance, students were taught to square dance in physical education, listened to the story *Barn Dance* in reading, wrote letters to the author, and watched a performance by a local square dancing group.

Cognitively disabled, learning disabled, speech and language, Title I, and gifted and talented students all were involved in the project. While doing the multidisciplinary unit, the teachers investigated the question "Does an inclusive model of connecting the curriculum accommodate students' individual differences?" The teachers answered this question with a positive response.

The teachers felt that all students in our diverse third-grade classrooms were successful. Numerous factors contributed to this success. We provided many hands-on, real-life activities for the students, using a thematic, integrated approach. Field trips and the involvement of the community members *were other contributing factors. The dedication, time, work, and inclusive efforts on the part of the staff members also helped this project succeed.*

A second example of a multidisciplinary curriculum was created by Katie Rhode, Mary Sullivan, Elizabeth Van Ness, and Linda Wilson, who worked with fourth-graders at Nichols School in Monona, Wisconsin.

Our original proposal was to develop an interdisciplinary unit integrating selected content and learning standards in art, music, and science at the fourth-grade level.

Created from a science unit titled "Water Environments," the multidisciplinary curriculum focused on the concepts of interdependence and change in each of the subjects involved. The teachers used what they called the "three Cs" as a unifying factor: that is, the sea, see (as in visual), and the musical note C.

What we learn to do,
we learn by doing.
—Aristotle

During the whole project the kids kept journals, which we called the 3 Cs notebooks. The notebooks were a great asset in the project because they traveled with the students to art or to music class. The notebooks helped to substantiate the connections we were making.

In science, change and interdependence were considered within the unit's study of ponds, streams, oceans, and the water cycle. In music, students investigated these concepts by studying the musical form rondo, which is cyclical and has a theme of interdependence and change. "Most amazing to me was their easy understanding of both the rondo form and its connection to the water cycle," wrote Van Ness, the music teacher. Students in art class made flip books that Wilson said would "show action and change over time. It would also allow students to explore the concept of the environment's impact on the life cycle of any given species."

In designing this multidisciplinary project, the three teachers focused on two questions: "What are the critical elements needed for implementing a multidisciplinary unit of instruction?" They identified the following elements as essential to this kind of work: trust, flexibility, ability to see different perspectives, open-mindedness, communication, time to plan and implement, relevance, and administrative support. Their second question was "What are the critical elements of multidisciplinary instruction that enhance student motivation and learning?" The second question, they discovered, needed further research.

The goal of third-grade teachers at Robbins Elementary School in Eau Claire, Wisconsin, was to facilitate collaborative planning. Team members were Jodie Baca, Sherry Brevick, Bonnie Fisher, Gerald Hein, Doug Markofski, Rebecca Mattson, Barb Redman, Sue Schwiebert, Mary Sieckert, and Linda Tomter. The group of teachers planned six multidisciplinary units: cooperation, interdependence, exploration, influences, discoveries, and diversity. Subject areas included language arts (reading, writing, listening, and speaking), social studies, health, math, explorations, and science.

We wanted to develop a curriculum that would encourage educators to reinforce school-wide learning and not just classroom learning. All teachers knew they needed to teach their curriculum, but it was exciting to see where connections could be made, so that not only was the music teacher reinforcing our work in the third-grade classroom, but we could do the same for her.

At South Middle School in Eau Claire, Wisconsin, sixth-grade teachers Susan Fulkerson and Daniel E. Ogan said their goal was to "weave the existing sixth-grade curriculum in social studies and science together by establishing a topic calendar for each. We would then use English as an integrated support for these areas by plugging in required curricular topics." Early in the year they sent a letter to parents saying they would teach the regular curriculum for Eau Claire sixth-graders but would organize it "thematically, so that the subjects fit together. We are trying to discover if students remember more when they are taught in a 'connected' manner." This became the action research question for these teachers. Some of the thematic units they created outlines for included systems and structure, cause and effect relationships, exploration, and treasures/celebration.

Integrated

In an integrated curriculum, the boundaries between separate subjects or disciplines disappear; teaching and learning are organized by center, which can be a topic, theme, question, or problem. In this type of framework, students learn and use knowledge and skills from various subjects or disciplines through an organizing center, but there is no formal recognition of the various disciplines involved, nor is any attempt made to label content as having come from any particular discipline.

Amy McClellan, a seventh-grade teacher at Wilson Junior High School in Appleton, Wisconsin, used this type of curriculum framework. The curriculum, which she planned with her students, was based on questions students had about themselves and their world. They identified themes in which individual and social concerns overlapped, and these became the focus of learning experiences. The themes identified were relationships, environment, future, violence, and family.

Students, either independently or in groups, investigated their questions that fell under the thematic heading, and the students created activities to find answers to their questions. Once students completed this, they became "experts" and presented what they discovered to their peers, parents, and teachers in a variety of ways throughout the school year.

You cannot teach a child to take care of himself unless you will let him try to take care of himself. He will make mistakes, and out of these mistakes will come his wisdom.
—Henry David Beecher

In the "Future" unit, students wanted to answer the question, "What am I going to do when I grow up?" This question became part of a smaller segment named "My So-Called Career." For this project, students completed surveys, identified and researched careers that interested them, and planned how they would do their studies. Students also arranged to shadow someone in the community who was working in the field they had chosen. They used that information and other data they collected to give presentations at a career day that was open to the public.

Students had the responsibility of naming the event, deciding on a date and time, and sending invitations. They determined the square footage and equipment they would need for their demonstration, made signs, ordered food and attended to many other details. They organized committees that controlled planning from beginning to cleaning up.

The focus of McClellan's action research project was, "What evidence can I provide that shows what students are capable of doing when encouraged to make decisions about their education?" As part of her project, she provided a detailed explanation of the previously mentioned integrated unit, self-assessments by students, a grading rubric for the unit, and student responses.

In another project at Onalaska (Wisconsin) Middle School, fifth-grade teachers Margaret Janeiro, Sue Liska, Jody Olson, and Ken Riley surveyed students to find out what each wanted to learn from a unit on oceans. Following is their explanation of how the unit developed:

Students were asked to list questions they were curious about related to oceans. Each teacher also formulated a list of questions to be answered. Both sets of questions were then categorized or grouped together under a major topic. For example, all questions related to plant life were grouped in one category, and all questions related to salinity were grouped into another. Each category was then prioritized. Based on the prioritized categories, we constructed our unit to answer the questions. The topics chosen for instruction were: ocean careers, animal adaptations, ocean properties, environmental issues, diversity of life forms, ocean geography, and measurement problem-solving. Using these topics, each teacher chose areas of interest and developed lessons accordingly.

Their action research focused on implementing a thematic unit in a school that had traditionally been departmentalized by subject. The team of teachers mapped out a ten-day lesson plan rotation for all fifth-grade students. It incorporated content into the study of oceans that normally would have been taught in reading, language, geography, mathematics, science, and art. Students picked up mathematical concepts by learning how to measure liquid capacity, completing word problems, and building a whale on the playground to understand size differences. They sharpened reading and language skills by reading novels related to the theme, working on new vocabulary, and performing library reference tasks. Students used science materials and concepts in studying ocean biology and considering the ocean as a habitat.

A third example of curriculum integration took place at Kegonsa Elementary School in Stoughton, Wisconsin. First-grade teacher Amy Covell and reading teacher Mary Bredeson used a model of integration to study the theme "Alive and Well" using mammals. This theme entailed a whole year of integrated studies derived from topics in the traditional curriculum. They incorporated civics, geography, English, mathematics, and the arts into their thematic unit.

We were freed from needing to think about the fragmented, specific subject areas normally used for instructional planning and therefore could concentrate on creating a challenging, meaningful, and coherent environment which would totally immerse the students. Students would use their interest to learn. We hoped that specific subject matter learning would evolve not, for instance, because of a math assignment using mammals as a story problem character, but rather that math skills would be necessary in order to answer some burning question or solve a problem in their study of mammals.

Another example of curriculum integration took place in a class in which teachers planned a multicultural unit called "Many Parts Make a Whole." Teachers Laurel Key, Fran Shafe, and Carole Siegel at Frank Lloyd Wright Middle School in West Allis, Wisconsin, planned two large projects where eighth-grade students drew upon English, reading, social studies, music, art, dance, and technology to complete activities.

Each student had to research his or her ethnic background and then find a symbol of that heritage for the design of a banner. The students also planned and organized the ethnic fair. The students were responsible for the publicity, ticket sales, decorations, and so on.

The action research question these teachers addressed was, "Does the teaching of multicultural activities have an effect on the achievement of at-risk students?" They also looked into whether "the teaching of multicultural activities affects the attitudes of students concerning their family heritages and other cultures."

Fused Courses

June Casey and Julie Mason at Oconomowoc High School created a fused class that consisted of English 10, Speech 10, and World History. They used World History to connect subjects, including units on Greeks, Romans, the Dark Ages, Middle Ages, Renaissance, and World War II.

While students learned Greek history in their World History class, students in English and speech were studying Greek theater. Not only did they get a basic history of the Greek theater but also an opportunity to read Antigone *in English class and* Oedipus Rex *in speech class. Students also gave speeches about Greek theater, were introduced to Aristotle's* Poetics, *built a life-size tableau museum of* Oedipus Rex *in the library, staged and performed parts of* Antigone *in the little theater, and taught each other a wide variety of Greek root words and prefixes.*

The action research question for this project was "Are there any significant differences in the achievement and attitudes of high school sophomores when they are heterogeneously grouped in an integrated setting?" The teachers looked at several questions related to this broad focus using student responses as well as other information. Below are three of the questions considered in the fused Rhetoric/World History course.

We concluded that integration of the curriculum and heterogeneous grouping are two steps in the right direction.

- Does the learner get more depth of knowledge in an integrated setting?
- Does integrated instruction make students more interested in the subject matter?
- Are relationships and connections between subjects easier to see and understand in an integrated setting?

The teachers answered each of the questions affirmatively.

What matters and what has always mattered are students. Are we doing our best for them? We concluded that integration of the curriculum and heterogeneous grouping are two steps in the right direction.

Assessment

Assessment must serve many audiences and purposes. It provides accountability to a district or community about program effectiveness. It furnishes information to parents about what is taught and learned. And it can help teachers, parents, and students understand student strengths and needs, while providing information to identify learning strategies and to guide instruction. Assessment should also bring performance to higher levels while defining standards and expectations for learning.

What form does assessment take when curriculum is connected? Does connected curriculum devalue discipline content or does it enhance content learning? How does portfolio assessment fit into the assessment of a connected curriculum? What is the place of student self-assessment in connected curriculum? Should students assess their own work, the work of others, and the curriculum itself? These are just a few of the questions that arise when one considers assessment in a connected curriculum.

The following comment is from a student in McClellan's class:

You have to have an open mind about everything. I learned in this project a lot about groups and about group commitment. I also learned about organization; you must always be organized!

During the course of the project, students in McClellan's class at Wilson Junior High School had a voice in planning all aspects of the curriculum, including determining the assessment tools they would use. McClellan observed that, for the first time, students had the opportunity to make decisions about their learning. The result was that they became confident investigators and communicators.

To help her students understand her expectations, McClellan had students fill out checklists during their projects so they could assess their own progress. She gave students a grading rubric so that they knew what was required for the unit. Finally, she reviewed her expectations with students and then asked them to discuss them in small groups. They were asked to provide alternatives for any parts of the rubric they disagreed with. Students then shared their suggestions and came to a consensus on what they thought were realistic expectations for portfolio grades. McClellan said that as a result of this sharing, students felt grading was fair, and even took ownership in the assessment process. McClellan also incorporated student self-assessment and student feedback. Students learned to develop goals and devise methods to achieve those goals.

At Grand Alternative High School in Milwaukee, Rebecca Mitteness-Wendel, and Cindy Zautcke worked with at-risk students. To ensure their students would not opt for truancy as a result of boring classes, Mitteness-Wendel worked to make algebra real for her students. With Zautcke, who taught English and composition, she designed instruction that kept students' interest.

Using attendance in school and in their classes as a gauge, the two teachers decided to make understanding of algebra even more concrete by inviting a science teacher to join their team. Using science applications to learn algebra, students were no longer asking, "Why are we doing this?" As students learned algebra through chemistry, physical science, and earth science, Mitteness-Wendel found she was able to teach more difficult mathematics concepts than in the past. Students in this integrated algebra class learned more content during the semester than students in the other algebra classes in the school.

We discovered that, like composition, algebra was a skill that was best learned when attached to some context. Students understood the math concepts best when we applied them to science.

When students had the opportunity to reflect on their work through end-of-the-year evaluations, their comments were overwhelmingly positive. The team also employed a mathematics proficiency test, which showed that students in the combined algebra and writing class were able to absorb more knowledge about mathematics than those studying mathematics separately.

In a multi-age classroom of fourth- and fifth-graders at Sugar Creek Elementary School in Verona, Wisconsin, Jo Bernhardt used a variety of assessment strategies to measure response to integrated curriculum. Among these were portfolio reflections, student and parent interviews, teacher anecdotal reflections, teacher observations, and more traditional formal assessments. Bernhardt's goal as a teacher was, as she put it, "to create a classroom full of thinkers." She defined thinkers as "students with a good foundation of skills who know when and how to use those skills in creative ways and can rely on themselves to solve problems." Using teacher observation and the reflections of her students, she found that through real-life integrated units, students applied a depth of knowledge to the topics being studied and showed a real interest in content. Students "were really thinking about what they were doing and it carried over into everything in the classroom."

At James Madison Junior High School in Appleton, Wisconsin, U.S. Civics teacher Mark Leschke and English teacher Greg Tate were convinced that rubrics could be an extension of authentic assessment work.

Through the process of trying to write a number of rubrics, Leschke learned that rubrics needed to be created to meet specific needs and that a standard rubric was not always appropriate. On a project early in the year that culminated with students writing a letter to a former teacher, and using a modified rubric, they found that "the number of perfect or near-perfect letters this year exceeded those of the previous year." Among the problems encountered was lack of time to confer with students and the lack of self-reflection built into the program. Leschke pointed out that creating and using a rubric is not simple, emphasizing that "it takes time, support, and guidance."

One student responded, it makes it more like real life.

Fifth-grade teachers at Onalaska Middle School began a unit on oceans by having their students write everything they knew about the topic. Students then kept learning logs as part of the portfolio. When the unit was completed, students once again wrote everything they knew about oceans. Then they used both writing exercises to write summaries of their knowledge about oceans and to evaluate their own learning.

When Fulkerson and Ogan wanted to go beyond traditional assessment methods to learn if students improved their achievement or if they remembered more when content areas were connected, the teachers went right to the source by asking students. After completing an integrated unit, they had students talk about the experience. One student responded, "It helps that when you go to the next thing you know a little about it." Others replied, "you can remember things from one class while studying a different class." And "it makes it more like real life." Teachers also surveyed parents for their perspectives on the effectiveness of curriculum integration. Many parents responded positively. One parent replied, "When you can truly connect and integrate across traditional disciplines, it's great." Another parent noted that connected curriculum"seems to provide an opportunity for the broader exploration of topics rather than just 'facts'."

Assessment of connected curriculum must include more than traditional tests to provide a full picture of what students have learned. Traditional assessments often show that students learn as much through connected curriculum as through separate subjects, but traditional assessments cannot mark the depth of understanding students achieve or the additional insights students gain when immersed in connected student centered learning. Traditional assessments cannot indicate, for example, the experiences students had as shown through the self-assessments and reflections from students. Said one student in her self-assessment, "if it wasn't for my best friend, I never would have finished. It shows me a lot about what I learned—not just commitment and organization, but friendship and loyalty."

Equity and Community

Curriculum, teaching practices, and assessment all contribute to the overall school community. Working toward a supportive school community requires a curriculum that is relevant to all students. Whether there are differences of ethnicity, gender, socioeconomics, language, or learning needs, the challenge of creating community is to accommodate the variety of needs encountered in today's classrooms.

At Kegonsa Elementary School, second-grade teacher Lisa Gutche and art teacher Rita Yanny decided to connect community as a theme across the disciplines of mathematics, science, art, language arts, drama, geography, and civics. The teachers developed a definition of community with the class—a place where people live, work, and play. Beginning with what they knew best, each student created a mobile of himself or herself and his or her family. The class discussed similarities and differences in individuals and families before considering the classroom and school community.

With data on class size and makeup, the second-graders used a variety of mathematics skills as they wrote story problems, performed calculations, made graphs, and drew comparisons. Students made lists of people who worked at the school, and decided to learn about the people and their responsibilities. Students developed questions, interviewed staff members, and took notes. After the interviews, students introduced their subject to the class using videos, posters, newsletters, and books.

From the school community, the class moved on to the rural community. Gutche invited students to suggest what they wanted to learn about farm life and occupations. The class took their sketchbooks along, drawing and taking notes as they traveled on a field trip to a local farmers' market. Throughout their study of the local rural community, students determined the focus of their inquiry. Gutche trusted her students to ask good questions, do solid research, and present their findings in appropriate ways.

When the class began to study the city and the urban community, Gutche sent letters to parents inviting them to share their occupations with the class. Parents came to school to describe their jobs or invited the class to their places of work. Later, students wrote letters to local residents who held jobs in which the students were interested.

Students received replies to their letters, went on field trips, and were visited by parents and community members who talked about their jobs. Yanny assisted students as they wrote and illustrated books about their chosen occupations. Through letters to pen pals in another state, in which they shared information about their own community, students compared their community with that of their pen pals.

To prepare for the final activity, which involved opening a "community cafe" at the school, the second-grade class visited a local bookstore to get ideas. They then worked together to create the concept of a community that brings together "people, ideas, occupations, art, books, and food in a lively, participatory way." Students produced a logo, T-shirts, souvenirs, art, table decorations, and books. They also designed and sent invitations, created a menu, prepared food, and set up the cafe themselves.

The sense of community that developed from this second grade's year-long study of community did not occur by accident. It was the result of collaborative planning by many teachers, including help from the speech and language teacher, reading specialist, and cognitive disabilities teacher to meet the needs of students with exceptional educational needs. The incorporation of individual differences and interests laid the groundwork for the cooperation that developed between students, faculty and staff, and parents and community members.

...incorporation of individual differences and interests laid the groundwork for cooperation.

At Haugen School in Rice Lake, Wisconsin, teacher Mary Pautsch and library media specialist Carol Reinagle worked with second grade learners with varying abilities, including Title I. They studied how their students could access information through technology for a unit on dinosaurs. As part of community building, the classroom teacher asked parents to interview their children about their dinosaur research and to write the children's answers and comments on interview sheets. In this way, each child's expertise could be reinforced by the family as well as teachers and classmates.

Pautsch and Reinagle found that incorporating technology into learning experiences was valuable to all the students. All of the Title I students said that working on the computer was a great experience. Students who may have had difficulty with the physical task of writing were able to take pride in their finished work. "They liked how nice and neat their reports looked after being printed," the teachers wrote.

Pautsch and Reinagle said the students were enthusiastic and motivated. The teachers were pleasantly surprised to note that "some of the Title I students handled the rough draft writing better than those students identified as gifted." They observed that all of the Title I students took their work very seriously and conducted themselves professionally throughout the unit.

At Tainter Elementary, Dianne Barkley, Kim Timmers, and Ava Schwartz focused on the effectiveness of an integrated curriculum in serving the needs of all students in an inclusive setting. With a diverse population of students ranging from cognitively disabled to learning disabled to gifted, the teachers wanted to learn whether an integrated curriculum could accommodate individual differences. The teachers designed a unit on farming using hands-on activities to tap into students' multiple intelligences. Modeling and demonstrations were used to foster student learning in real-world situations. All students found these activities meaningful. As a result, after the project, cognitively disabled students were more willing to participate in the regular classroom activities.

Field trips and the involvement of parents and community members also contributed to the students' interest and success. Student success was also attributed to the time and effort of the staff who worked together to support the project. Said the teachers, "This was a team effort and the strengths of our members complemented each other. It really improved our working relationship."

In addition to a classroom community of student learners, these teachers had also created a community of teacher learners.

A community of learners should include parents as well as students and teachers. Kindergarten teacher Debra H. Sirek of Hilltop Elementary School in Rice Lake, Wisconsin, found a way to build community among parents. Wanting to make sure that parents of her kindergarten students understood the concepts of cognitively guided instruction in mathematics, Sirek invited parents to a series of three workshops. The first was an information session, the second a classroom demonstration for parents and kindergartners, and the third an activity time for parents and kindergartners.

Through surveys, Sirek learned that parents felt very positive about what they had learned and about the opportunity to share special time with their children. The children also enjoyed the workshops and were happy to be valued enough to be given this kind of opportunity.

John Lehman, an administrator for the New London (Wisconsin) School District, focused on increasing community support for his district's connected curriculum projects through evening meetings at the local public library. During these meetings, entitled "Curriculum Conversations," Lehman surveyed adults about their expectations and concerns about the public schools and responded to their questions. He also surveyed junior high parent groups and parents registering their children for kindergarten.

What he learned from the meetings and surveys was encouraging. Parents place great value on "developing student attributes such as respect for self and others, ability to work with others, and responsibility and citizenship." They want their children to have a rich school experience. Additionally, he learned that parents will support connected curricula if "educators can demonstrate that children are more turned on to learning and that more learning is taking place through connected curriculum." Parents, he found, want to be part of the learning community.

...parents will support connected curricula if educators can demonstrate that children are more turned on to learning.

At Oconomowoc High School, Julie Mason and June Casey wanted to test their theory that student achievement can be enhanced by heterogeneous grouping and an integrated curriculum. To do this they developed an interdisciplinary curriculum called World History/Rhetoric. Heterogeneous groups of tenth-grade students, which included those taking the standard course as well as honors options, received challenging content in history, speech, and English. In these heterogeneous groupings, a community of learners was created through the use of student-selected group projects using teacher-selected materials. Students were supported with extra help as needed and staff was supported through training in learning styles, multiple intelligences, and reading/learning strategy.

Teachers planned activities and overlapped instruction to increase students' depth of knowledge. Student comments such as the following attest to that overlap: "We learn about events in general in World History. In English we pick a certain topic and go into detail about it." Another student said that "by deepening my knowledge of English and history, I found I talk about it more at home." More than 80 percent of parents of honors option students felt their children were doing work that resulted in higher levels of learning. Through student surveys, activities, and teacher observation, Mason and Casey learned that students in the World History/Rhetoric curriculum felt that they achieved a deeper understanding of the subject matter in all three content areas than did honors or standard students taking the courses separately.

In addition to measuring student performance, the two teachers wanted to see if such a program would help students become more accepting of others. From the teachers' early anecdotal records, the usual group dynamics seemed to persist. Strong students monopolized groups while weaker students did not want to participate. However, when a project was begun that required a variety of different tasks, things changed. Said the teachers, "Students could participate from their strengths. As a result, these groups worked cooperatively extremely well."

From then on, students were successful at conducting group activities with a diverse group of students. One student said, "Other people's opinions and talents are always useful." Another responded, "My attitude has changed by being able to see other students' ideas and ways." The teachers found that acceptance and appreciation of diversity grew throughout the year.

McClellan's expectations for her junior high students are so high that she includes them in planning and implementing curriculum. She said doing this creates a "sense of pride in my students that I rarely saw before." It results in students who are engaged in learning and who develop a sense of responsibility as they set goals and plan methods to achieve quality results. Abilities her students strengthened include decision-making, problem-solving, and communicating.

Even when assessing student performance, McClellan considers input and suggestions from students regarding performance criteria. When doing this, her expectations are not lowered by the changes the students suggest; rather, the changes make the assessment criteria more meaningful to the students. After a student exposition in which students planned, organized, and arranged for all the details to make it succeed, she noted, "The kids were wearing their pride and rightfully so!"

Mitteness-Wendel and Zautcke maintain an atmosphere that is more like a college than a high school despite the fact that their students are considered to be "at-risk." There are no bells, and rules are kept to a minimum. According to the teachers, "Students feel safe and respected, which gives us a strong foundation to build on in the classroom."

And build they did. They worked to change students' perceptions and learning outcomes about algebra. Through integrating instruction in English, science, and algebra, having students together for longer periods of time, and having students develop portfolios, they found that the "comfort level of all the students increased when it came to discussing ways to solve problems and using graphic calculators to predict outcomes." They also noted improved relationships among the students. Attendance improved overall and students saw more relevance in the study of algebra. The students themselves thought that the "portfolios gave a fuller, more honest picture of who they were."

A community of learners is more than a place where students learn and work. It is also a feeling that comes when a student recognizes that she or he is an important part of a group where all learners, students, teachers, and parents are valued. In these classrooms, there is a rethinking of the roles, rules, and relationships of students, teachers, and parents. New ways of approaching curriculum, teaching practices, and assessment have contributed to the overall school community in these settings. When creating connected curriculum, these teachers considered the learning needs of the individuals in their classrooms as well as how to engage each student in the learning process. As a result, students became responsible for themselves as learners.

...students became responsible for themselves as learners.

Lessons from CTC

6

What CTC Taught
Connected Curriculum Lessons
Action Research Questions
Observations and Project Lessons
CTC Issues and Answers
References

BEST COPY AVAILABLE

What CTC Taught

Educational research on teaching and learning has long supported curricular designs other than the separate subject approach. Action researchers found that connecting the curriculum generates student excitement about learning and helps students understand content in new ways. Teachers also found that by studying several subjects in a connected curriculum, students are able to achieve a broader understanding of curriculum content.

The connected curriculum approach gives students positive, successful learning experiences and gives teachers new ways to present content, tap new talents within themselves, and discover new facets of their profession. For many teachers, the CTC Project may have been their first opportunity to work with connected curricular designs, to teach across several disciplines, or to collaborate closely with their colleagues. This chapter is based on reports written by action researchers at the conclusion of their projects.

Connected Curriculum Lessons

The majority of teachers used a multidisciplinary curriculum design. One of the questions the project sought to answer was "What organizing centers did teachers use for connecting the curriculum?" For example, did they choose an organizing center based on a subject, on student suggestions, on social problems, or other themes or issues?

Project reports show that the majority of organizing centers came from an existing subject, most often social studies or science. Here are a few examples:

- Two third- and fourth-grade teachers planned a unit on Wisconsin immigration that drew upon content from social studies, language arts, health, science, music, physical education, and math.
- Elementary school teachers of science, music, and art planned a unit in which students learned about interdependence and change by studying water and life cycles. The teachers incorporated content from each of their subject areas.
- Two middle school art and social studies teachers had students study northwest coastal Native Americans through the lenses of the teachers' respective disciplines.
- Middle-school teachers of science, social studies, art, and technical education melded content from their various subjects into a unit on paleontology and geologic time.
- A high school French teacher and a U.S. history teacher combined their subjects to give students a more comprehensive understanding of the French presence in Wisconsin.

Other teachers adopted social problems or issues as organizing centers, as in the following examples:

- Elementary school students used multiple perspectives to investigate the question "How will we solve the food shortage problem?" The teachers who worked together in the project incorporated content from science, social studies, mathematics, and language arts.
- Several middle-school teachers combined language arts and social studies content in the theme "peace through baseball."

Following are summaries of teacher responses concerning connected curriculum frameworks:

Who selected the organizing centers?

In all but a few projects, the teacher or team of teachers doing action research selected the organizing center or unit theme.

What sources of knowledge were used?

The majority of teachers used a wide range of sources, including new forms of technology such as computers resources. Most teachers used curriculum materials provided by the district, including textbooks, but few relied on these as their sole source. The teachers also incorporated content and materials from popular culture, DPI curriculum guides, and documents on state and national standards. Many teachers also asked members of their own communities to contribute their expertise and knowledge.

Many teachers asked members of their communities to contribute expertise and knowledge.

Were the students involved in planning the connected curriculum?

When students took part in determining what they would learn, their participation came about in many ways. After a theme was chosen, teachers asked students for questions about the topic or suggestions about what to study or how to approach the subject. For instance, after oceans was selected as a theme for one CTC project, teachers asked students for questions they had about the subject. In another project, students had ongoing participation in planning the curriculum. These students learned about consensus decision making by having input on themes and by planning class activities. Students also were able to help set the class schedule as to when assignments would be completed and students helped formulate methods to assess their work.

In some CTC projects, students were consulted after the unit or theme began. Teachers then solicited suggestions about what kind of projects or work could be done to study the subject. In most cases, student suggestions had to adhere to established criteria. Following are some brief examples of how students became involved in helping to shape connected curriculum work:

- Students who had learned the basic elements of square dancing decided it would be fun to create their own dance calls.
- A group of students who had studied the elements of the mystery story chose to write their own mystery stories.
- Once a theme had been chosen, students exercised personal freedom in selecting their own research topics. However, they had to follow established criteria in doing their work.

Several projects were based on teachers and students making decisions together. One of the choices the students made during a project was to study careers. Students not only selected this theme but contributed ideas for the projects and activities. Teachers who led this project felt that thematic units based on common concerns kids have about themselves and the world make students excited and enthusiastic about learning. The involvement of students in active decision-making proved to be a positive part of the entire learning experience.

Two other important questions the project raised were "What did the teachers learn?" and "Did the teachers report learning benefits for students?" Teachers reported both they and their students learned a great deal during the action research process. More than half of the written reports included statements that indicated improved student learning. Some of the comments included the following:

- Educating the whole child makes it easier for the child to learn.
- Immersing a student in study improves application and recall.
- Most students do better and learn more when connections are made.

Again and again, teachers reported positive learning results for their students.

Teachers wrote that action research shows "students are capable of much more than previously thought." Students "were better able to retain and use new skills and knowledge in later units, and were engaged more than when the subjects are separate." The reports also state that the connected curriculum frameworks enabled students to "have a more global perspective" and allowed "more students to use higher level thinking skills." Again and again, teachers reported positive learning results for their students. In fact, no teachers reported that student learning suffered because of the move to connected curriculum.

Teachers were not asked to report test results or the grades they gave students. But in cases when such information was provided, students performed as well or better than in previous years. This was true even though some students took the same tests as non-CTC students, tests that were based on a nonconnected curriculum.

Teacher collaboration seemed to strengthen the connected curriculum. The reports include comments in which teachers state that connected units were richer, had more perspectives, and that "teaming by teachers utilizes strengths of teachers in a way that benefits students." The majority of teacher teams indicated they wanted to work together again in the future on connected curriculum frameworks. Many participants said that it was extremely valuable for them to meet with other teachers. They were thankful for opportunities to exchange ideas, compare experiences, and help each other with problems. All of the teachers commented about the importance of release time for such meetings. Many even said they would not have been able to do their projects without the opportunity to confer with colleagues.

Action Research Questions

The action research question provided the focus for project participants. Teachers found their action research to be a positive professional growth experience. Some of their questions included:

- What were the positive and negative feelings of our students and ourselves toward a multidisciplinary approach and toward cross-grade-level team-teaching?
- Does integrating the curriculum in an inclusive manner accommodate students' individual differences?
- What are the critical elements needed for implementing an interdisciplinary unit of instruction?
- How do integrated units affect teachers?
- Is it possible to implement a thematic unit for 103 students in subject areas that traditionally have been departmentalized?

Some teachers used the connected curriculum framework itself as the focus of their action research. Their major concerns were planning and implementing a connected curriculum, and its effect on their students.

Another area investigated was how the action research question was answered. When teachers perform action research, they collect several kinds of data to evaluate and interpret. The various kinds of data teachers employed in their projects included:

- surveys of students, colleagues, and parents—both before and after the project;
- interviews with students, colleagues, and parents;
- personal journals indicating how teachers changed their thinking and teaching practices during the project;
- journal excerpts, books, and speakers that corroborated classroom findings;
- test results that reflected student achievement;
- lists of the skills students learned; and
- reflections on what teachers themselves learned by switching from a separate subject approach to a connected curriculum framework.

As is often the case with action research, many teachers did not find clear answers to their questions. Indeed, many teachers instead encountered new questions that needed further study. Still, most teachers did learn a great deal about the issues they researched, about how they could teach more effectively, and about the intertwined nature of teaching and learning. Here are brief summaries of what was learned in three action research projects.

Oconomowoc High School
Oconomowoc, Wisconsin

This project by June Casey and Julie Mason combined English, speech, and history into a fused Rhetoric/World History course that could be taken for standard credit or as an honors option. In their final report, the two teachers said they chose their topic because they "felt strongly that student achievement is enhanced in heterogeneous groups and through integration." Of the 126 students involved, more than half enrolled for honors credit. Casey and Mason surveyed and interviewed their students, as well as two other groups of students who took the separate courses of English, speech, and World History.

Their research question was: "Are there any significant differences in the achievement and attitudes of high school sophomores when they are heterogeneously grouped in a connected setting?" They found the following results:

- More students in the connected curriculum felt that they achieved a deeper knowledge of the subject matter in history, public speaking, reading strategies, and study/learning strategies than did those enrolled in separate subject classes.
- Twice as many students in the connected curriculum felt somewhat or a lot more accepting of other students.
- About 90 percent of students in the connected class felt that they were being challenged, whereas one-third of the students in straight standard classes felt they weren't.
- It appears that honors students in the connected setting did not feel that the heterogeneous grouping limited their learning; 88 percent of the students in the connected class did not believe that their learning was being slowed or held back as the result of being grouped heterogeneously.
- Lower level students enjoyed working with more motivated peers, thus a significant number of the students benefitted from being grouped with honors students.

Tainter Elementary School
Rice Lake, Wisconsin

In a unit on farming that focused on interrelationships with the local farming community, teachers Dianne Barkley, Ava Schwartz, and Kim Timmers examined data from a wide variety of sources, including journals, projects related to *Charlotte's Web*, thank you notes, art work, math activities, interview sessions, letter writing, cursive writing, poetry, observations, listening to students' conversations with each other, discussions with students, photos, slides, and video. Students also had to keep a "KWL chart" (a tool used to describe what you already know, what you want to learn, and what you learn).

They asked the question: "Does connecting the curriculum in an inclusive manner accommodate students' individual differences?" The teachers found:

- Student differences can be accommodated.
- The cognitively disabled-borderline students improved verbal and social skills as a result of being included in learning activities with other students.

Washington Junior High School
New London, Wisconsin

Band teacher Roberta Porfilio-Sawall worked with a team of teachers to plan a multidisciplinary unit that supported a Milwaukee Symphony program called "Words & Music." Each team member taught students about a piece of music: its historical context, the musician who performed and wrote it, and so forth.

The teachers' research question was "How can the band experience be made more meaningful to the student?"

Porfilio-Sawall said students felt band was more meaningful when other teachers on the team "added their expertise in their respective fields" to the music being studied. The data on which Porfilio-Sawall based this conclusion included observations by team members of student enthusiasm, of the number of times they practiced, of what they wrote and said in class discussions, and student surveys.

Observations and Project Lessons

Those involved in facilitating the CTC Project eventually came to see it as a form of action research because the project itself followed the cyclical steps of action research. Facilitators and participants came together, created a plan of action, implemented it, observed what happened, and then reflected on what they had learned. New action plans or modifications were made, implemented, and then the cycle was repeated. Following are conclusions drawn from the work of facilitators and participants of the project.

Action Research

- Things do not always go according to plan. When teachers work with real students in real schools, they sometimes need to modify their plans. On occasion, teachers learn things they had not expected.
- Action research is a promising professional development activity especially valuable in evaluating the effectiveness of connected curriculum frameworks.

Connected Curriculum Frameworks

- Students in connected curriculum classrooms are able to interpret and integrate new knowledge in ways their teachers did not predict.
- Many teachers and administrators are unfamiliar with frameworks to connect the curriculum, including multidisciplinary and integrated approaches.
- Teachers are interested in implementing a connected curriculum.
- Teachers involved in such projects need time to plan and to discuss their work. They also need time to construct connected curriculum and to evaluate and record the results.
- Traditional school structures can interfere with teachers' attempts to connect curriculum.

Standards

- The day-to-day needs of students take priority over national or state standards.
- Teachers can meet content standards through connected curriculum frameworks.
- Many teachers reported that connected curriculum frameworks led to higher standards and more challenging content than a separate subject approach.
- The connected classroom is best suited to broad, flexible standards.
- Teachers without experience in connected curriculum are concerned with covering the regular material expected for their subject and tend to believe there is only a single way to make connections, whereas CTC Project teachers saw a multitude of possible connections and ways to cover the curriculum.
- Teachers believed connected curriculum frameworks better prepared students for future school work.

Support Issues

- Teachers are willing to implement connected curriculum frameworks even without local administrative or state support.
- Teachers want to adopt more authentic ways of teaching and learning so they can motivate and engage students.
- Many teachers have an intuitive sense that a fragmented curriculum interferes with student learning and that a connected curriculum provides more opportunities for student learning.
- Local administrators, state education department staff, and other school personnel are similar to teachers in that if they are unfamiliar with connected curriculum, they may not appreciate or value connected curriculum practices.
- State Department of Public Instruction sponsorship of connected curriculum frameworks increases teacher participation, especially when such support is not available at the school or district level. Educators who participated in this project valued the material and human resources the DPI provided to support the project.
- The quality of education provided through the program was enhanced by access to resources from the CTC Project.

During the CTC Project, participants shared many of the same experiences, problems, and questions about connected curriculum. Those issues form the basis for this chapter. The answers are drawn from what the teachers learned themselves, as well as from educational research on the subject.

CTC Issues and Answers

If making curriculum connections requires more work, time, and coordination from teachers, why bother?

There are compelling arguments for connecting the curriculum across disciplines. But unless it is done properly, the results can be superficial and short-lived. Some efforts at connecting curriculum may involve elaborate activities, solid individualized learning, and create a lot of fun for students but fail to make any real or permanent changes in the learning and teaching environment. Instructional activities require resources and support within the system. Teachers also have to spend time planning (either by themselves or in teams) to ensure that the new curriculum framework will address important skills, knowledge, and concepts students are required to learn.

At the same time, a connected curriculum will produce many benefits, for teachers as well as students. Teachers will experience greater collegial support and decreased feelings of professional isolation; insights from other team members; increased richness of instructional activities; improved program effectiveness; increased authority and accountability for instructional effectiveness; and the chance to move to participatory problem-solving and decision-making in their classroom.

Many teachers who implemented connected curricula noted that their students became more actively involved. Students learned to use multiple resources, both within the school and the community; to experience school and learning as a connected experience; to routinely assess themselves; to set high goals for themselves; and to take pride in their accomplishments.

How does connecting the curriculum affect student academic achievement?

Almost without exception, it has been shown that students in any type of connected curriculum will learn as well as students in conventional, separate subject programs, and they often perform even better (Vars, 1995). These results hold regardless of whether the connected curriculum is delivered by one teacher in a self-contained class or by an interdisciplinary team of teachers representing different subject areas. It should be noted that, for the most part, these comparisons are based on standardized achievement tests designed for a separate subject curriculum.

Is there any evidence supporting other benefits from connecting the curriculum?

Advocates assert that a connected curriculum makes learning more meaningful for students, especially if the curriculum is student centered and organized around issues or problems (Vars, 1995). Making learning more meaningful usually results in increased student motivation, fosters higher order thinking, enhances interpersonal skills, and improves student attitudes toward their peers, teachers, and school. It is also believed that students better enjoy learning in a connected curriculum, as demonstrated by favorable comparisons of attendance rates and disciplinary referrals. It is very difficult to measure claims of other, less tangible benefits; such evidence tends to be anecdotal or based on personal opinions of students, teachers, and parents. Some studies have shown that students in connected programs are better at critical thinking, have better relationships with their peers and teachers, and have more positive attitudes toward learning.

It is believed that students better enjoy learning in a connected curriculum.

How does the type of connected curriculum affect results?

To date, few studies have attempted to distinguish between multidisciplinary, integrated, and other approaches to connecting the curriculum. Most of these found few significant differences.

Are learning experiences of students in connected curriculums taught by one teacher different than those involving a team of teachers?

Some evidence suggests that student achievement and interpersonal relations are greater in self-contained classes than in team programs, but that either is superior to separate subject arrangements. Differences between connected curriculums involving one teacher and teams of teachers appear to vary according to subject matter and student background, such as socioeconomic status. Students predicted to have below-average success seem to do better under the closer teacher-student relations possible in a self-contained class, especially in verbal subjects like English, reading, and social studies (Vars, 1995). On the other hand, the specialization in one or two subject areas that is possible in a team approach may bring about higher achievement with students at the upper end of the grade distribution. Some educators argue for a combination of both approaches using teams of two teachers. Each teacher would teach two or three subjects in an extended block of time. The time blocks would enable students and teachers to develop good rapport, and academic instruction would be sufficiently focused so that teachers could develop expertise in their teaching fields. Additional research is needed to verify this recommendation.

How does participation in a connected curriculum affect student success in later schooling?

Studies carried out in the 1950s and 1960s indicate that students who completed a connected curriculum in middle or junior high school nearly always made normal or better marks in high school (Vars, 1995). The Eight Year Study, confirmed by later research, concludes that graduates of connected high school programs usually do better in college than those from conventional programs, both in academic performance and in participation in extracurricular activities. Moreover, graduates of the most experimental, student-centered programs made better progress in college than those from high schools that departed only slightly from the separate subject approach (Aiken, 1942).

What should schools do when implementing new curriculum?

New curriculum should not be sold as a panacea that will solve all problems. Nonetheless, it is an approach that has proved its worth when properly implemented (Vars, 1995). Each school district should continuously monitor student outcomes. Test scores, proficiency examination results, attendance, attitude surveys, and other data should be gathered before the new program is instituted and at regular intervals after it begins. The findings should be carefully interpreted, with allowances for initial differences arising from the act of changing framework organization.

What can schools and teachers do to contribute to the research and knowledge base that supports connected curriculum?

All teachers who are involved in connecting the curriculum should keep careful records as the basis for action research (Vars, 1995). Schools and districts should budget for ongoing research on a wide variety of student outcomes. Districts can involve nearby colleges and universities in helping to assess the results of a new approach. Results should be shared carefully and honestly with students, teachers, parents, and the community as a whole. Results should also be disseminated more widely to other schools and educational groups in the area, the state, and perhaps even nationally. Results should include the full range of student outcomes, not just test scores. This is especially critical in as complex an undertaking as connecting the curriculum, where the benefits are not easily measured but are, nevertheless, real and important.

What kind of assessment should be applied to connected curriculum?

Assessment is part of learning, not just something to be imposed at the end of the process. Performance-based assessment tools such as projects, exhibitions, demonstrations, and portfolios can illustrate student effort, progress, and achievement. Connected learning can be assessed by tying performance standards to complex tasks and portfolios that show learning over time. Assessment devices should be as authentic as possible, linking the standards and expectations to real world tasks and performance standards. Such devices should include assessment of both disciplinary and cross-disciplinary content and connections. Assessment of connected curricula should focus on the analysis of complex tasks because connected learning from various disciplines does not consist of isolated skills.

How does performance-based assessment affect discipline content?

Performance-based assessment does not eliminate or diminish academic content. Assessment must link content and procedural knowledge with challenging performance standards. An authentic approach to assessment cannot be maintained if academic content and procedural knowledge are separated. The assessment tasks and portfolios must contain elements of complex thinking, information processing, effective communication, collaboration, and personal reflection.

How can teachers deal with time constraints and mandated schedules?

Curriculum connections and other changes in the design of educational programs may have to begin with a limited number of faculty. Some school districts or buildings offer separate organizational structures within one building. A team or teams of teachers could be identified to develop blocks of common time for flexible instructional periods. Those teachers who are committed to the initiative can work with and support each other. If the project is successful, teachers can show the data to other educators in order to promote the program and to provide support for changes to facilitate the framework.

How do challenging content standards link with connected frameworks?

The frameworks should provide students the opportunity to integrate their knowledge, to see how all things connect. This can be accomplished through learning experiences in specific content areas or through multidisciplinary or integrated learning experiences. Connected curriculum frameworks should include both separate and integrated learning approaches in recognition that both frameworks can help students meet challenging standards and connect their school learning with other life experiences.

References

Aiken, Wilford. *The Story of the Eight-Year Study.* New York: Harper, 1942.

Vars, Gordon F. *Synthesis of Research: A Briefing Paper Written for Connecting the Curriculum.* Madison, WI: Department of Public Instruction, 1995.

Implications for Professional Development of Teachers

7

Introduction
Professional Development in Wisconsin
Strategies for Professional Development
CTC Recommendations
References

BEST COPY AVAILABLE

Introduction

Professional development enables teachers to keep pace with changes taking place in society

As a result of socioeconomic, cultural, political, technological, and historical factors, education and its institutions are undergoing rapid and significant change. Educators need to continually update their skills to meet the challenging conditions that confront them in the classroom. The key to making this possible is to ensure that teacher education not end when the teacher enters the classroom. A continuous process of professional development enables teachers to keep pace with changes taking place in society.

Professional development is an ongoing, systematic learning process designed to improve teaching and learning for the benefit of all students. This process should include not only teachers, but school board members, professional staff, cooks, bus drivers, parent volunteers, citizen committee members, and anyone else having a stake in the educational system.

Universities have traditionally provided professional development for educators, most commonly in the form of courses for academic credit. But professional development activities can be conducted also by school district personnel, community agencies, private companies, professional organizations, Cooperative Educational Service Agencies (CESAs), the Wisconsin Technical College System, and others. Professional development can consist of action research, individually directed self-study, shadowing and mentoring, and more. It is critical that professional development plans incorporate activities that promote lifelong learning and inquiry into teaching and learning. In planning professional development, however, it is vital to keep in mind that the underlying goal of all such activities is to improve student learning.

Professional Development in Wisconsin

In 1995, the State Superintendent's Task Force on Restructuring Teacher Education and Licensing developed a set of principles for professional development programs for teachers. Many of these visions and principles correspond with CTC goals and objectives, including the following:

Career-Long Principle—Teachers are lifelong learners who fulfill a variety of roles in the education community, and these roles change over time.

Integrated Curriculum Principle—Professional development programs can use an integrated curriculum and action research approach to educational issues. In the general education component of the teacher education program, students should have the opportunity to experience an integrated curriculum. The knowledge and skills contained in an academic major or minor should be organized and taught so that preservice and inservice teachers make connections among various components of their education.

Action Research Principle—Action research is a process that promotes continuous learning. It is vitally important that teachers learn the inquiry process.

Connections Principle—It is especially important that preservice and inservice teachers make connections among the various aspects of pedagogy—between theory and practice and between pedagogy and content. Students can be taught in a manner that will enable them to conduct action research and conduct inquiry into teaching and learning. By making connections and taking part in action research, students will gain a better understanding of the teaching and learning process and of content areas. Figure 22 shows the recommended framework for professional development.

Figure 22

Framework for Professional Development

Stages of Development	**Stage 1: Preservice Teacher**	**Stage 2: Beginning Teacher**	**Stage 3: Professional Teacher**	**Stage 4: Master Teacher**
Provider:	Institution of Higher Education (IHE) provides initial education programs in collaboration with Local Education Agency (LEA).	LEAs, in collaboration with IHE and others, provides ongoing educational opportunities for professional development.	Individual development plan with IHE, LEA, DPI, professional academies, associations or organizations, or others as providers.	Teacher may become a provider of professional development opportunities.
Performance Expectations:	Teacher education student shows evidence of meeting Wisconsin Standards for Teacher Development and Licensure and completes appropriate professional degree.	Teacher shows evidence of completing an individual professional development plan, collaboratively designed and based on teacher, district and/or state need with a specific focus on the Wisconsin Standards for Teacher Development and Licensure.	Teacher continues to develop professional portfolio or professional development record according to individual plan approved by LEA.	Teacher continues leadership role or role-model activities and assists in organizational professional development activities.
Professional Development Plan:	Structured, approved programs; action research; integrated curriculum; content standards.	Less structured, guided by mentor, master teacher, principal, and/or university faculty.	In depth plans approved by principal and involving master teacher and university faculty.	Comprehensive plan showing leadership, action research, and guidance for other teachers and for organizations.
Assessment:	IHE recommends and DPI grants five-year, nonrenewable beginning teacher license; performance-based assessment in classroom.	LEA recommends and DPI grants five-year renewable professional teacher license; performance-based assessment done in classroom or professional work settings.	LEA assesses and recommends renewal of five-year license; performance-based assessment done in classroom or professional work setting.	LEA assesses and recommends renewals of seven-year license; performance-based assessment of Wisconsin Standards in classroom or professional work setting.
License:	None or intern license	Five-year, nonrenewable	Five-year renewable	Seven-year renewable

Strategies for Professional Development

Professional development occurs when teachers, administrators, and other professional staff are willing to study educational issues, to conduct inquiry into the teaching and learning processes, and to examine their own practice. Professional development includes action research, mentoring, and making use of professional development schools as part of an ongoing process.

Action Research

...action research can lead to changes that will improve teaching and learning.

Experience shows that action research is an excellent professional development activity. Preservice and inservice teachers, administrators, and other professional staff who perform action research become more involved in their own professional development. These educators first identify an area of work that they would like to examine. The self-reflection, systematic observation, collaboration, and experimentation involved in action research can lead to changes that will improve teaching and learning. Participants can support each other and engage other teachers in professional development. Educators, teachers, administrators, and counselors working together on a professional development activity such as action research will facilitate school-wide growth.

Mentoring

Mentoring is a form of professional development for beginning teachers, administrators, or other professional staff in which a beginning educator is paired with an experienced master educator who explains school policies and practices, shares methods and materials, and helps the beginning educator solve problems. Mentors may also guide the professional growth of beginning educators by promoting reflection and by fostering collaboration and shared inquiry.

Professional Development Schools

Professional development schools (PDSs) are exemplary elementary or secondary schools. PDSs play a role in professional development of all educators, from preservice educators to master educators through partnerships and collegial interaction among school districts, universities, and professional organizations. PDSs have a three-part mission: implementing research- and experience-based practices to maximize student learning, fostering the professional development of teachers and other educators, and testing and refining practice and structure through action research and inquiry.

Preservice teachers, administrators, and other beginning educators can be placed in a PDS for field work, student teaching, or to gain practical experience. Cooperating teachers participate in course work and other structured activities designed to prepare them to be effective supervisors. Master teachers or administrators often teach university courses. Frequently, a university faculty member is based at the PDS to serve as a resource person. The professional development facilitated through a PDS is an essential part of the mission and fabric of daily life in the school, not an afterthought. Ideally, this mission of professional development will be present for all teachers, administrators, and other professional staff at all stages in their careers.

Ongoing Process

Professional development must be an ongoing process. A professional development program might include workshops for a team of teachers, administrators, and staff based on a topic of concern for the team. The workshop should be followed by periodic meetings of the team throughout the school year. Between meetings, team members can study the issue, read about it, reflect on it, identify potential solutions, try solutions in the classroom or work setting, assess results of the trials, and reflect on future approaches. Technical assistance can come from university faculty, DPI personnel, other district staff members, community agencies, and others.

Successful professional development programs provide for school-wide collaborative activities that lead to formation of learning communities that will network people, knowledge, ideas, and exemplary practices.

CTC Recommendations

The recommendations in this section emerged from study of the work of teacher researchers, interviews with project participants, and the experiences of project facilitators. These recommendations are based on the stages of professional development identified by the State Superintendent's Task Force on Restructuring Teacher Education and Licensing. The recommendations are intended to link the work of the CTC Project with knowledge, behaviors, and skills needed for teachers to participate fully in developing and implementing connected curriculum. The overall conclusion is that educators must occupy a central role in their own professional development.

Collaboration of Institutions of Higher Education, the State Certification and Licensing Agency, and Local School District

1. Encourage collaboration among institutions of higher education, school districts, CESAs, and the Wisconsin Technical College System in providing professional development courses and programs that support connected teaching and learning. Also encourage collaboration in creating structures that provide teachers information about current professional development opportunities and provide access to such programs to teachers—regardless of their location.
2. Explore teaching methodologies, integrated curriculum design, and connected and interdisciplinary course work that support integrative teaching and learning at the undergraduate, graduate, and school district levels.

3. Create licensing categories that support development of disciplinary knowledge and skill in content areas as well as the ability to create curriculum, instruction, and assessment connections that cross disciplinary lines.

Teacher Preparation Programs

1. Create new structures in institutions of higher education that encourage integrative teaching and alternative approaches to research, such as:
   - faculty development and grant opportunities for the development of cross-disciplinary approaches to curriculum, instruction, and assessment;
   - faculty "credit" toward promotion and tenure for teaching interdisciplinary courses and conducting action research; and
   - approval of unique combinations of courses or supporting fields as an alternative to minors.
2. Create new teacher development programs that:
   - require students to be involved in connected learning experiences in their preservice instruction using integrated curriculum in discipline-based courses, student teaching, and methodology courses;
   - establish integrative seminars to link program experiences, identify common problems of practice that cut across disciplines, and bring together preservice students from various disciplines;
   - introduce student teachers and interns to action research as a strategy of reflective practice to use throughout their preservice education; involve student teachers in action research activities or projects wherever possible; and
   - create a professional development system for cooperating teachers that includes experiences in classroom action research and connected teaching and learning.

Professional Development of Licensed Teachers

1. Implement new models of professional development consistent with connected curriculum and increase opportunities and resources for teachers to make connections.
2. Explore methods to provide professional development opportunities through professional development centers, CESAs, distance learning experiences such as videoconferencing and other technologies that provide for individualized course work in local school districts, mentorships, apprenticeships, community service, career development, or on-the-job experience in business or industry. Also, provide interdisciplinary mentoring opportunities so teachers can work collaboratively across disciplines to develop and support each other's professional development plans.
3. Develop ways to identify and assess knowledge and instructional skills development and proficiency levels. Recommend a professional development portfolio for all educators that shows evidence of their progress and mastery of professional standards.

Professional Development Standards for Teachers, Education Administrators, and All Providers of Professional Development Programs

1. Develop standards for professional development that are similar to the National Staff Development Council Standards.
2. Recommend creation of a system for providing ongoing recognition for professional development providers whose work could be sanctioned for continued licensing. Such a system would provide a level of quality control that would be consistent for all professional development providers.
3. Recommend that state-recognized development activities (for credit or clock hours) include district needs, performance evaluation needs, and personal interests of educators.

References

State Superintendent's Task Force on Restructuring Teacher Education and Licensing in Wisconsin. *Task Force Report*. Madison, WI: Department of Public Instruction, 1995.

Appendixes

8

A. Selected CTC Action Research Projects

B. Wisconsin's Educational Goals

C. Resources for Action Research

D. Resources for Connecting Curriculum

BEST COPY AVAILABLE

Selected CTC Action Research Projects

Elementary School Projects

Altoona School District

Pedersen Elementary School

"Beliefs Influence How We Think, Feel, and Act." The project developed an integrated and culturally relevant fourth grade curriculum involving several disciplines. A second thematic unit was manufacturing, centering on making glass. The thematic units were taught in a way to show students connections. The experience also enabled teachers to reflect on how they were going about helping students learn in this new way.

Team Members: Donna Walther, Lynda Olson

"Mysteries." This third grade project used the study of the theme of mystery stories to integrate curriculum. The teacher created a mystery that the students had to solve using the scientific method and community resources. The students used many areas of the curriculum in this project. They also held a trial and wrote mystery stories of their own.

Team Member: Shannon Lynch

"Integration With Different Grouping Styles." The project used a variety of themes to integrate a second grade curriculum, including studies of Native Americans, cultures from Japan, Mexico, England, and Germany, and animals and their environment. The integrated curriculum unit on animals combined social studies and language arts, including having students write postcards as an animal living in the rain forest to human beings who are destroying their home. The units featured both flexible ability groups and heterogenous groups.

Team Members: Kathy Carey, Terri Hanson, Rachel Torud

Eau Claire Area School District

Robbins Elementary School

"Making Connections School Wide: A Process." This project sought to put into effect a third grade connected curriculum plan that had been developed a year earlier. A major focus was to find new ways to integrate curriculum, resources, and materials, and to work with a team of teachers to design, develop, implement, and evaluate six thematic units to increase inclusion of all students in the learning process.

Team Members: Jodie Baca, Sherry Brevick, Bonnie Fisher, Gerald Hein, Doug Markofski, Rebecca Mattson, Barb Redman, Sue Schwiebert, Mary Sieckert, Linda Tomter

Madison Metropolitan School District

Wingra Elementary School

"Basic Math Skills in an Integrated Curriculum." The teacher developed curriculum connections including different number systems, such as Roman and Egyptian numerals, and had students use them to create newspaper ads. One of the ads encompassed research on the type of food raised and eaten in Egypt. A central theme for the year was how much it costs to raise a child; students were amazed to find their math came in handy outside of math class.

Team Member: Lisa Kass

Monona Grove School District

Nichols Elementary School

"Interdependence And Change." This fourth grade project considered the concepts of interdpendence and change in science, music, and art. The theme was the environment of water. Students studied different water environments and the effects of seasonal changes, land, and water cycles. Cooperative groups wrote rhythm rondos with water themes in music; in art they demonstrated their new knowledge by creating a flip book about a life cycle of their choice.

Team Members: Katie Rhode, Mary Sullivan, Liz Van Ness, Linda Wilson

New Berlin School District

Elmwood Elementary School

"Nutrition and Digestion." This third grade class studied a thematic unit on nutrition and digestion. Nutrition is a unit in science, but under the umbrealla theme the project also incorporated literature, writing, social studies, and mathematics. Skills and strategies were connected to the unit, as were the multiple intelligences.

Team Member: Sandy Becker

"Housebuilding." Fifth grade students built a model of a home during the school year. They integrated mathematics, vocational education, writing, interviewing, problem solving, and art. The housebuilding entailed both floor plans and three-dimensional models of the finished product. The project tested the idea of whether a real-life simulation could help student achievement and boost interest in academic work.

Team Members: Eileen Mattman, Rebecca North

Racine School District

Olympia Brown Elementary School

"Fish Thematic Web." The project used thematic webs to integrate subject areas (geography, science, literature, language, music, social studies, mathematics, physical education, art, and parental activities) for a blended kindergarten class—one that included typically developing children and multi-category exceptional education students. This format offered teachers the time and flexibility to meet the needs of all students.

Team Members: Kathy Carson, Linda Haas

Reedsburg School District

Ironton-LaValle Elementary School

"Wisconsin Immigration." This project focused on finding out the positive and negative feelings students and educators had toward a multidisciplinary approach and toward cross grade level teaching. The study of Wisconsin immigration encompassed communicative arts, social studies, science, and health in one unit for third and fourth grade students. The teachers also planned lessons with brain research and life skills in mind. Immigration to Wisconsin was chosen as a theme to develop an understanding of why the U.S. has a democratic form of government.

Team Members: Julie Garvin-Bie, Pat McGee, Kathleen Robinson

Rice Lake, Wisconsin

St. Joseph School

This parochial school staff became involved in a school-wide shift from focusing primarily on textbook oriented instruction to an integrated thematic approach. Of particular interest are the stages in the professional growth process of teachers aquiring new knowledge and skills.

Team Members: All teachers

Rice Lake Area School District

Haugen Elementary School

"Technosaurs: Second Graders, Technology, and Dinosaurs." This project was designed to answer three questions: How do children access information through the use of technology? Can students with low abilities successfully utilize technology to learn? Does inclusion in the regular classroom enhance these students' performance? The second grade students involved were taught how to use computers and CD-ROM materials in their study of dinosaurs.

Team Members: Mary Pautsch, Carol Reinagle

Hilltop Elementary School

"Parents and the CGI Approach to Mathematics." This project tried to find out if the attitudes of parents toward the kindergarten mathematics curriculum would improve when children are taught using the Cognitively Guided Instruction (CGI) approach to instruction in an integrated curriculum. Workshops were held to introduce the CGI concepts to parents to make sure they understood curriculum integration and this approach to teaching mathematics.

Team Member: Debra H. Sirek

"Integrated Multicultural Curriculum on Japan." The theme of the project was cultural diversity and involved the disciplines of social studies, science, language arts, mathematics, physical education, music, and art. The four team members wanted to investigate whether development of a curriculum framework on this topic would encourage other staff members to become involved in CTC and other integrated curriculum projects.

Team Members: Jill Holtegaard, Sandra Johnson, Michelle Seymour, Paul Van Natta

Tainter Elementary School

"The Farming Link." The third grade curriculum was fully integrated using a thematic approach during a three week period. The unit was based on the farming community and its interrelationship with other community members. Parents, staff, and community members were involved in the project, which included many hands-on activities addressing the seven multiple intelligences. Cognitively disabled, learning disabled, speech and language, Chapter 1, and gifted and talented students were all involved.

Team Members: Dianne Barkley, Ava Schwartz, Kim Timmers

Stoughton Area School District

Kegonsa Elementary School

"Mammals: Alive and Well." The project used the first grade science theme of mammals to connect and make planned curriculum frameworks relevant. Teachers were expected to develop connected frameworks in the disciplines of English, history, geography, civics, and the arts. The project also sought to study natural connections with a new model of professional development.

Team Members: Mary Bredeson, Amy Covell

"Empowering Students to Discover Their Own Voice." The project included third grade learning disabled, cognitively disabled, speech and language impaired, as well as talented and gifted students. The teacher focused on having students become involved in making decisions about learning. For instance, the students took four afternoons to write a mission statement on what they wanted to accomplish during the school year—their first use of consensus decision making during the year.

Team Member: Jim Larson

"Community Cafe Conversation." The project focused on the study of community. Student research and community partnerships played a big role in classroom work, with second grade students learning through hands-on and real-life experiences. Students transformed their classroom into the "Community Cafe," which featured highlights of the year-long study.

Team Members: Lisa Gutche, Rita Yanny

"Seeds of Change—We're Growing to Make a Difference." Fifth grade students studied the question, "how will we solve the food shortage problem?" Students recorded ideas and feelings in journals as they studied this topic in a variety of ways. Big ideas involved in the study were that exploration changes peoples lives, people communicate about events in their lives, and plants use life processes like all living organisms. Students with cognitive disabilities were included in this project.

Team Members: Mary Buchholz, Tina Hanson, Joan Olsen

"Keeping Company with Culture." The project used the study of Japan, Russia, Brazil, and Norway as a base to connect subjects. The study included emphasis on maps and also cultural and holiday celebrations. The year-long theme of culture allowed third grade students to monitor, graph, and study their assessment scores. The continuous student monitoring is believed to have positive effects on student achievement in language arts.

Team Member: Patricia Prahl

Verona Area School District

Sugar Creek Elementary School

"Do Real-World Activities Improve Student Achievement?" This project started with several assumptions: that in the "real world" people rarely use skills in isolation; that most things are connected; and that students will benefit from learning skills in a connected way for an activity they might do some day as adults. The multi-age classroom of fourth and fifth grade students studied Wisconsin from the perspective of the ongoing governor's race in an integrated way, including a visit from a former governor.

Team Member: Jo Bernhardt

"Children Using Technology to Learn." This ninth through eleventh grade project addressed the disciplines of science, language arts, and computer literacy through computers. The computers became work stations students, including some with learning and cognitive disabilities, rotated to and learned to use as a tool to interpret data rather than just as a toy. The project explored computer capabilities in teaching.

Team Member: Michelle A. Nelson

Waukesha School District

Randall Elementary School

"Pursuing Integration: An Ongoing Process." This project focused on teacher perceptions and how they changed during the course of integrating curriculum. The two questions it tried to answer were "Do Waukesha fifth grade teachers perceive that they can cover more curriculum by teaching scope and sequence checklists within integrated units? and Do they perceive that the curriculum will become more meaningful to students when presented through integrated units?"

Team Members: Mary Bader, Tim McCarthy

Madison Metropolitan School District

John Muir Elementary School

"Connections—Primitive House Construction." This teacher used house construction techniques of Native Americans to connect the curriculum. In building a wigwam, the fourth grade class studied geometry of circles and arches, and history of wigwam structures, learned a traditional Indian game called cha-ha, and incorporated art and other subjects into the curriculum.

Team Member: Mark Wiley

Middle School Projects

Appleton Area School District

Einstein Middle School

"A Utopian Middle School." This group of teachers designed a curriculum that opened up opportunities for connecting the curriculum by retooling the school schedule. They also developed a plan to help teachers determine where they are in integrating subject matter, and helping students draw connections in the curriculum.

Team Members: Michelle Froehlke, Sue Patschke, Michael Pekarske

Wilson Junior High School

"Teachers and Students Making Decisions Together." Using the theme "My So-Called Career," students had to answer questions concerning the kind of jobs they would like to have in the future. This included a "shadow day" in which students spent time with people from various professions and a student exposition where they could display what they learned to parents and other members of the community. This personal investigation involved many subject areas.

Team Member: Amy McClellan

Eau Claire Area School District

South Middle School

"Connecting the Curriculum." This project focused on the sixth grade curriculum thematically so that the subjects fit together. English, social studies, reading, and science were linked with monthly themes like survival, imagination, treasures, and the future. A basic feature was to examine curriculum connections that already existed.

Team Members: Susan Fulkerson, Daniel Ogan

Onalaska School District

Onalaska Middle School

"Ocean Unit." Using the oceans as a theme, teachers connected the disciplines of reading, language, geography, mathematics, science, and art. The project tried to determine if it was possible to implement a thematic unit in an open space system in which subject areas had traditionally been departmentalized. A benefit of the project was time the teachers had for self-reflection.

Team Members: Margaret Janeiro, Sue Liska, Jody Olson, Ken Riley

Sun Prairie School District

Sun Prairie Middle School

"Roadblocks to Connecting the Curriculum." This project combined art and social studies. The objective in connecting the two classes was to see if the knowledge students gained in art class, where they studied traditional art of northwest coast Native Americans, would enhance learning in social studies. In the social studies class, students consistently referred to what they had learned in art class about the subject, something that impressed even other students taking the social studies class.

Team Members: Sue Collins, Sharon Miller

Verona School District

Verona Area Middle School

"The Process of Integration in Science." This project sought to integrate science topics, such as paleontology and geologic time concepts, to social studies, art, and technical education classes, where students designed floor plans for a museum and built a large pyramid decorated with Mayan symbols. The curriculum integration focused on the theme of Native American legends and history, including the Mayans. Another aim was to investigate the overall concept of curriculum integration and how it affects learning.

Team Member: Marsha L. Raksany

"Ingredients for Successful Integration." This project integrated the CORE disciplines of mathematics, science, language arts, and social studies, with the ENCORE disciplines of family and consumer education, technology education, art, and foreign language. CORE and ENCORE teachers worked together on this project to determine natural bridges to make the integration successful.

Team Member: Kim Robitschek

"Curriculum Connections in the Middle School." This project was undertaken as part of the school's integration pilot program. This part of the project attempted to answer several important questions: At what level of integration do students start seeing benefits? What kind of changes will increase student awareness of connections within an integrated curriculum? Did connecting the curriculum make learning more fun or interesting?

Team Member: Margarita Tamez.

"What Kind of Connections are Made?" This project focused on the connections students see from one class to the next and whether they are applying that knowledge in other classes. It also explored what types of bridges were needed for students to understand connections between CORE and ENCORE teaching. Tools to increase awareness of curriculum connections were also addressed.

Team Member: Diana L. Borth

West Allis School District

Frank Lloyd Wright Middle School

"Creating Coherence in English, History, Civics, Geography, and Fine Arts." The project used the study of ethnic heritage and multiculturalism as a means of weaving together the subjects of English, history, civics, geography, and fine arts. Students studied ethnic cultures, including investigations into their own heritage. Activities included field trips, a meeting with a survivor of the Holocaust, and an ethnic fair. There were 98 students involved, including 15 identified as at-risk.

Team Members: Laurel Key, Fran Shafe, Carole Siegel

Junior High School Projects

Appleton Area School District

James Madison Junior High School

"Rubrics 3." This project combined writing assignments for English and U.S. Government in an attempt to improve the quality of student writing. An article from the Sunday newspaper, with 20 words underlined, was given to students. Students had to define each word and use ten of the words in a composition. Weekly samples were kept in a portfolio and students and teachers used the portfolio to assess student progress.

Team Member: Mark Leschke

New London School District

Washington Junior High School

"What Factors are Important in Curriculum Integration?" This project collected data from 17 individuals who tauigh at the school. They filled out a checklist about their rationale for connecting the curriculum, on which they checked items which had most influenced their decisions to teach in a connected curriculum framework. Teachers were able to expand on their experiences in oral interviews, which were also compiled.

Team Member: Carol A. Bitar

"Teaching Instumental Music." This project focused on developing innovative methods of teaching instrumental music, as well as linking music with other subject areas. Student surveys, student interviews, and journaling were tools used to guide the implementation and evaluation of the project.

Team Members: Carol Bitar, John Lehman, Diane Lemin, Howard Pinch, Roberta Porfilio-Sawall

High School Projects

Appleton Area School District

Appleton East High School

"Introducing History-Media." This project aimed at engaging learning styles and assessing students in real life activities while connecting the required junior American history and American literature curricula. The work involved producing a television newscast on one of the periods of American history and holding a mock presidential election after studying presidential campaigns.

Team Members: Michael W. Bergen, William F. Reinke

"Assessing Teamwork Skills." This project was used to teach team skills, journalism, and assessment during study of a constitutional newspaper unit.

Team Members: Michael W. Bergen, Pat Cosello

Eau Claire Area School District

Eau Claire North High School

"A Work Experience, Career Exploration Program." The school's Work Experience, Career Exploration Program (WECEP) was a vehicle for the integration of English and history. The activities included writing essays, giving speeches, and creating an historical fiction short story. Two classes put on the play*West Side Story* as a way to study ethnic conflict in U.S. history.

Team Members: Jim Erdman, Jim Jeffries, Tom Kuklinski

Kettle Moraine School District

Kettle Moraine High School

"Troubleshooting: Ensuring the Success of Curriculum Integration." This project is based on the assumption that troubleshooting is needed to ensure that innovation in education, in this case curriculum integration, is to be successful. It assumes that unless serious consideration is given to potential problems, full value will remain unrealized. The project did this by assessing four basic criteria: time, budget, schedule, and incentives.

Team Members: Barbara E. Reamer

Milwaukee Public Schools

Grand Alternative High School

"Integrating English and Algebra." This alternative school of 142 at-risk students studied whether integrating algebra and English would increase student knowledge of algebra. Students were taught word problems, with an emphasis on writing about mathematics. One of the problems students had was anxiety over writing in mathematics class. The result was that students learned more compared to students in other algebra classes, and scored better on a new test linked to graduation.

Team Members: Rebecca Mitteness-Wendel, Cindy Zautcke

Milwaukee High School of the Arts

"The French Presence in Wisconsin." The goal of this project was to give students a better understanding of the history of Wisconsin and its relationship to the westward movement of both European colonists and Native Americans, and to understand the continuing European impact on the continent of North America. The project strived to show connections between various curricular areas in studying this theme. Among the skills students learned were map reading and how to work cooperatively.

Team Member: Elizabeth E. Dussault

"Introduction to Aesthetics." This project gave students a general introduction to aesthetics, centered on helping students develop a personal aesthetic vision and approach to artistic analysis. The study involved connections between the arts. Students were able to develop their own cross-disciplinary studies to shed light on literary theory or the stylistic/visionary quality of particular works.

Team Member: Robert Staggenborg

"World Studies and Ethnic Literature." This project focused on connecting the study of world cultures by combining social studies and English classes, with an emphasis on language and the arts. Students had to pull together information from the various disciplines to consider connections between Africa and modern art; the geography and heritage of Southeast Asia and poetic forms, including Haiku; and an analysis of the cultural revolution in China through Chinese art.

Team Members: Glen Copper, Rebecca Mormann

"Relating Art History to One's Self." Students were assigned to research an artist or time period, write about that topic, and do self-portraits. The art was to incorporate research the students had done. Students then had to write a paper summarizing the experience.

Team Members: Rose Balistreri, Suzan Zacharski

Oconomowoc Area School District

Oconomowoc High School

"Rhetoric/World History." This project studied the attitudes and achievements of high school students heterogenously grouped in an integrative setting. The project connected the studies of English, speech, and history.

Team Members: June Casey, Julie Mason

School District Projects

Eau Claire Area School District

"Staff Development Curriculum Frameworks." This project focused on the design of a staff development framework to facilitate the proces of thematic curriculum connections. The framework linked with district curriculum initiatives and addressed the core curricula of science, social studies, language arts, and math.

Team Members: Barb Manzo, Mary Kay Miller, Karen Hirsch, Deb Zehms, Susan Savolainen, Beck Mattson

New London School District

"The Community Connection." This project was intended to increase support for the district's CTC projects by opening communication channels with members of the community. The project helped the district generate information on what was happening in the schools, communicated why changes were needed, and how the district would use those changes to achieve a better school experience for all students.

Team Member: John Lehman

WISCONSIN'S EDUCATIONAL GOALS

VISION

Wisconsin's public schools exist for all students so they have an equal opportunity to attain their highest level of academic achievement, growth, and development.

Public education is a fundamental responsibility of the state. The constitution vests in the state superintendent the supervision of public instruction and directs the legislature to provide for the establishment of district schools. The effective operation of the public schools is dependent upon a common understanding of what public schools should be and do. Establishing such goals is a necessary and proper complement to the state's financial contribution to education. Each school board should provide curriculum, course requirements, and instruction consistent with the goals established. Parents and guardians of pupils enrolled in the school district share with the state and school board the responsibility for pupils meeting the goals.

Educational goals are not all the same. They differ in who implements them, who or what is directly affected by them, and the immediacy of their impact on the classroom. For convenience, the following goals are divided into three major categories: Learner Goals, Institutional Support Goals, and Societal Support Goals.

LEARNER GOALS

Learner goals refer to our expectations for students. What should students know and be able to do as a result of their time in the educational system? These goals apply to the students rather than the society or the institutions within which they are educated.

Schools exist for students to learn and to reach their full potential. The first three learner goals are the basis for development of a statewide assessment system and provide the basis upon which students achieve the other learner goals.

THE LEARNER WILL:

1. Build a substantial knowledge base.

Students will build a solid knowledge base developed from challenging subject matter in computer/information technology, environmental education, fine and performing arts, foreign language, health, language arts, mathematics, physical education, reading, science, social studies, and vocational education.

2. Develop thinking and communication processes.

Students will develop a command of thinking processes (analysis, creative thinking, problem solving, decision making, visualizing, concept development) that permit them to interpret and apply the knowledge base. Communication processes (listening, speaking, reading, writing, viewing, image making, and other symbolizing) enable them to communicate thoughts with others.

3. Apply knowledge and processes.

Students will build upon knowledge and apply learning processes to create new ideas and understandings, enhance human relations, expand awareness, and enrich human experiences.

4. Acquire the capacity and motivation for lifelong learning.

Students will develop their natural curiosity to acquire habits of inquiry and a love for learning which will motivate them to continue learning throughout their lives.

5. Develop physical and emotional wellness.

Students will acquire the attitudes, knowledge, and habits to grow physically and emotionally healthy, develop self-esteem and confidence, and exhibit a healthy lifestyle.

6. Develop character.

Students will exhibit personal characteristics, such as compassion, conviction, curiosity, ethics, integrity, motivation, and responsibility.

7. Be a responsible citizen.

Students will possess and exercise the knowledge and processes necessary for full participation in the family, civic, economic, and cultural life of a complex interdependent, global society. Students will acquire an understanding of the basic workings of all levels of government, including the duties and responsibilities of citizenship. Students will make a commitment to the basic values of our government, including reverence and respect for and the history and meaning of the U.S. flag, the Declaration of Independence, the U.S. constitution and the constitution and laws of this state, and acquire a knowledge of state, national, and world history.

8. Be prepared for productive work.

Students will acquire knowledge, capabilities, and attitudes necessary to make them contributing members of a dynamic national and world economy and prepare them for the transition from school to work.

9. Respect cultural diversity and pluralism.

Students will demonstrate the knowledge and attitudes necessary to understand and respect individual and multicultural diversity and to work cooperatively with all people.

10. Develop aesthetic awareness.

Students will become aware of and be able to generate those forms of experience that have artistic and aesthetic meaning.

BEST COPY AVAILABLE

INSTITUTIONAL SUPPORT GOALS

Institutional support goals have to do with the learning context and environment and are the means that support the achievement of learner goals. They include such things as adequate buildings, adequately prepared teachers, reasonable teacher planning time, and appropriate materials. Many of these factors have a direct impact on the classroom and the students. Institutional support goals deal with conditions that are within the control of the school district through its school boards and administrators, assuming that society has provided the necessary resources. If a goal affects the learning environment and is attainable without action by entities outside the local school district, it is called an institutional support goal.

To accomplish these goals and provide appropriate instruction, adequate resources, time, staff development, funding, technology, and facilities must be available. A governance model that encourages local decision making might better ensure that all parties play a role in deciding the allocation of resources.

INSTITUTIONS WILL:

1. Focus on academic achievement.

The primary mission of schools will include a focus on academic results to ensure that learning occurs.

2. Set high expectations for students and schools.

School staffs, parents, and community members must set high expectations so that all students will achieve the expected educational results.

3. Address the needs of all students.

Schools will recognize the widely varying circumstances and backgrounds that children bring to school and will design strategies and alternative programs to meet the changing needs and diverse learning styles of students.

4. Establish a climate of respect.

The school atmosphere will ensure that students and staff are treated with respect and dignity so that they respect others and so that students are better able to learn.

5. Provide a wide range of educational offerings.

Schools will offer a wide range of curricular and co-curricular activities so that students will have additional opportunities to learn teamwork, cooperation, and the application of learning.

6. Provide an active learning environment.

Schools will provide an environment in which students are actively engaged in learning that connects curriculum, instruction, and assessment.

7. Provide a positive physical setting for learning.

Schools will provide safe and stimulating environments conducive to active learning.

8. Meet the needs of professional staff.

Staff will have the resources, preparation, and encouragement to perform successfully. Staff should have adequate time and financial support for professional development, collaboration in course planning, strategy development, and innovation to meet the needs of children.

9. Establish family partnerships.

Schools will create an environment that seeks the active participation of families to maximize learning.

10. Promote collaboration within the school and community.

Schools and school boards will facilitate collaboration between and among all school staff and community members and connect the curriculum and delivery

SOCIETAL SUPPORT GOALS

Societal support goals, like institutional support goals, are the means that support the achievement of learner goals. If met, they ensure that students will have the necessary foundation to learn. They include such things as adequate health care, adequate nutrition, adequate funding for education, and safe, drug-free environments. These goals have significance beyond the educational community. Still, they have a crucial, if indirect, effect on children's learning. If children are not secure, properly nourished, or in good health, they will find it difficult to learn. If a goal requires action by forces outside the school district structure, it is called a societal support goal.

To accomplish these goals, society must make the commitment to invest in a quality education for all children, ensure that schools are staffed by well-prepared and caring personnel, invest its resources and leadership to ensure that children flourish, and provide support for families to provide a nurturing environment for their children.

SOCIETY WILL:

1. Make children its top priority.

Wisconsin will make the education and nurturing of all children its top priority.

2. Provide fair and adequate funding for education.

Society will act to resolve the disparities among school district financial resources needed to ensure that students, regardless of where they live, meet state educational expectations.

3. Provide safe schools, neighborhoods, and communities.

Society will promote drug- and violence-free schools and communities.

4. Ensure that children at all levels are ready to learn.

Society will provide support for parents and families to meet the ongoing nutritional, safety, physical, and emotional health needs of their children. Parents and families will instill in their children the importance of education.

5. Develop partnerships.

Society will develop partnerships between and among educators, students, parents, community, labor, business, industry, other educational institutions, and government agencies to better serve students and families.

6. Provide educational, cultural, and recreational opportunities.

Society will provide educational, cultural, and recreational opportunities that will enhance the quality of life and learning for all citizens.

7. Enhance educational equity through information technology.

Society will provide the necessary resources for schools to capitalize on information technologies such as telecommunications and computer networks to extend curriculum by using delivery systems such as distance learning.

8. Support local decision making.

The primary mission of state educational governance will be to support local districts, allow maximum flexibility for local decision making and innovation, and employ reasonable measures of accountability. The primary indicator of district effectiveness shall be academic results.

Resources for Action Research

Anderson, Gary L., Kathryn Herr, and Ann Sigrid Nihlen. *Studying Your Own School: An Educator's Guide to Qualitative Practitioner Research*. Thousand Oaks, CA: Corwin Press, 1994.

Cochran-Smith, Marilyn, and Susan L. Lytle. *Teacher Research and Educational Knowledge*. New York: Teachers College Press, 1993.

—. "Communities for Teacher Research: Fringe or Forefront?" *American Journal of Education*, May 1992, pp. 298-324.

—. Inside/Outside: *Teacher Research and Knowledge*. New York: Teachers College Press, 1992.

Corcoran, Thomas. *Helping Teachers Teach Well: Transforming Professional Development*. Madison, WI: Consortium for Policy Research in Education, Wisconsin Center for Educational Research, University of Wisconsin-Madison, 1995.

Elliott, J. "What Is Action Research in Schools?" *Journal of Curriculum Studies*, 10, 1978, pp. 355-357.

—. *Action Research For Educational Change*. Bristol, PA: Open University Press, 1991.

Evans, Claryce, and Margaret Stubbs. *Educational Practitioners: Absent Voices in the Building of Educational Theory*. Wellesley, MA: Wellesley College Center for Research on Women, Working Paper, No. 170, 1987.

Goswami, D., and P. Stillman, eds. *Reclaiming the Classroom: Teacher Research as an Agency for Change*. Portsmouth, NH: Boynton/Cook, 1987.

Hamilton, Mary Lynn. "Relevant Readings in Action Research." *Action in Teacher Education*, 16(4), 1995, pp. 79-81.

Hopkins, D. *A Teacher's Guide to Action Research*. Milton Keynes, UK: Open University Press, 1985.

Hubbard, R.S., and B.M. Power. *The Art of Classroom Inquiry: A Handbook for Teacher-Researchers*. Portsmouth, NH: Heinemann, 1993.

Johnson, Carol Schulte, and Inga Kromann-Kelly. "Using Action Research to Assess Instruction." *Reading Horizons*, 35(3), 1995, pp. 199-208.

Krueger, Richard A. *Focus Groups: A Practical Guide for Applied Research*. Newbury Park, CA: Sage, 1988.

Lincoln, Yvonna S. "In Search of Students' Voices." *Theory Into Practice*, 34(2), 1995, pp. 88-93.

Little, Judith W. "Teachers' Professional Development in a Climate of Educational Reform." *Educational Evaluation and Policy Analysis*, 15(2), 1993, pp. 129-151.

Miles, M.B., and A.M. Huberman. *Qualitative Data Analysis: A Sourcebook of New Methods.* 2nd ed. Newbury Park, CA: Sage, 1993.

Myers, Miles. *The Teacher-Researcher: How to Study Writing in the Classroom.* Urbana, IL: National Council of Teachers of English, 1985.

Mohr, Marian, and Marion MacLean. *Working Together: A Guide for Teacher Researchers.* Urbana, IL: National Council of Teachers of English, 1987.

Nixon, J., ed. *A Teacher's Guide to Action Research.* London: Grant McIntyre, 1981.

Noffke, Susan. "Action Research: Towards the Next Generation." *Educational Action Research*, 2(1), 1994, pp. 9-22.

Noffke, Susan, et al. "A Conversation About Action Research and Democratic Schooling." *Action in Teacher Education*, 16(4), 1995, pp. 82-86.

Oberg, A., and B. McCutcheon, eds. "Teacher as Researcher." *Theory Into Practice* (Theme Issue), 29(3), 1990.

Paley, Vivian. "On Listening to What the Children Say." *Harvard Educational Review*, 56(2), 1986, pp. 122-131.

Patterson, Leslie, John Stansell, and Sharon Lee. *Teacher Research: From Promise to Power.* Katonah, NY: Richard C. Owen, 1990.

Ruddock, J. "Changing The World of the Classroom by Understanding It: A Review of Some Aspects of the Work of Lawrence Stenhouse." *Journal of Curriculum and Supervision*, 4, 1988, pp. 30-42.

Sagor, Richard. *How to Conduct Collaborative Action Research.* Alexandria, VA: Association for Supervision and Curriculum Development, 1992.

Schon, Donald. *The Reflective Turn: Case Studies in and on Educational Practice.* New York: Teachers College Press, 1991.

Strauss, Anselm L., and Juliet Corbin. *Basics of Qualitative Research: Grounded Theory Procedures and Techniques.* Newbury Park, CA: Sage Publications, 1990.

Van Maanen, J. *Tales of the Field: On Writing Ethnography.* Chicago: University of Chicago Press, 1988.

Vulliamy, G., and R. Webb. "The Influence of Teacher Research: Process or Product?" *Educational Review*, 44(1), 1992, pp. 41-58.

Warner, Laverne, and Polly Adams. "Teachers as Action Researchers in the Classroom." *Dimensions of Early Childhood*, 24(1), 1996, pp. 22-25.

Zeichner, Ken. "Personal Renewal and Social Reconstruction Through Teacher Research." In Sam Hollingsworth and Hugh Sockett, eds. *Teacher Research and Educational Reform.* Chicago: University of Chicago Press. 1994, pp. 66-84.

Resources for Connecting Curriculum

Banks, James A. "Multicultural Literacy and Curriculum Reform." *Educational Horizons*, 69(3), p. 140.

Beane, James A. "Curriculum Integration and the Disciplines of Knowledge." *Phi Delta Kappan*, 76(8), 1995, pp. 616-622.

—, ed. *Toward a Coherent Curriculum*. Alexandria, VA: Association for Supervision and Curriculum Development, 1995.

—. "Creating an Integrative Curriculum: Making the Connections." *NASSP Bulletin*, November 1992, pp. 46-54.

—. "Rethinking the Middle School Curriculum." *Middle School Journal*, May 1990, pp. 1-5.

—. *A Middle School Curriculum: From Rhetoric to Reality*. Columbus, OH: National Middle School Association, 1990.

Brady, Marion. *What's Worth Teaching?: Selecting, Organizing, and Integrating Knowledge*. Albany: State University of New York Press, 1989.

Brough, Judith, et al. "Practicing What You Preach: Preparing Teachers for an Interdisciplinary Curriculum." *Schools in the Middle*, 96(4), 1995, pp. 13-19.

Burns, Rebecca C., and Beth D. Sattes. *Dissolving the Boundaries: Planning for Curriculum Integration in Middle and Secondary Schools*. Charleston, WV: Appalachia Educational Lab, 1995.

Caine, Renate Nummela, and Geoffrey Caine. *Making Connections: Teaching and the Human Brain*. Alexandria, VA: Association for Supervision and Curriculum Development, 1991.

Charbonneau, Manon, and Barbara E. Reider. *The Integrated Elementary Classroom: A Developmental Model of Education for the 21st Century*. Boston: Allyn & Bacon, 1995

Cushman, Kathleen. "What's Essential? Integrating the Curriculum in Essential Schools." *Horace*, 9(4), March 1993.

Davis, James R. *Interdisciplinary Courses and Team Teaching: New Arrangements for Learning*. Oryx Press, 1995.

Dempster, Frank N. "Exposing Our Students to Less Should Help Them More." *Phi Delta Kappan*, February 1993, pp. 433-437.

Drake, Susan M. *Planning Integrated Curriculum: The Call to Adventure*. Alexandria, VA: Association for Supervision and Curriculum Development, 1993.

Duffy, Gerald. *Reading in the Middle School*. 2nd ed. Newark, DE: International Reading Association, 1990.

Ellingsen, Robert. *Classroom of the 21st Century: The Integrated Thematic Instruction Approach to a Brain Compatible Environment*. Oak Creek, AZ: Susan Kovalik and Associates, 1989

Erb, Thomas O., and Nancy M. Doda. *Team Organization: Promise, Practices, and Possibilities*. Washington, DC: National Education Association, 1989.

Fogarty, Robin. *The Mindful School: How to Integrate Curricula*. Palatine, IL: IRI Skylight Publishing, 1991.

Gardner, Howard. *Multiple Intelligences: The Theory in Practice*. New York: Basic Books, 1993.

—. *The Unschooled Mind: How Children Think and How Schools Should Teach*. New York: Basic Books, 1991

—. *To Open Minds: Chinese Clues to the Dilemma of Contemporary American Education*. New York: Basic Books, 1989.

—. *Frames of Mind: The Theory of Multiple Intelligences*. New York: Basic Books, 1983.

Glasser, William. *The Quality School: Managing Students without Coercion*. New York: Harper Collins, 1990.

Goodlad, John I. *A Place Called School: Prospects for the Future*. New York: McGraw Hill, 1984.

Jacobs, Heidi Hayes. *Interdisciplinary Curriculum: Design and Implementation*. Alexandria, VA: Association for Supervision and Curriculum Development, 1989.

Kirby, Dan, and Carol Kuykendall. *Mind Matters: Teaching for Thinking*. Portsmouth, NH: Heineman, 1991.

Kline, Peter. *The Everyday Genius*. Arlington, VA: Great Ocean Publishers, 1988.

Kovalik, Susan. *Integrated Thematic Instruction*. Oak Creek, AZ: Susan Kovalik and Associates, 1993.

Kovalik, Susan, and Karen Olsen. *Kid's Eye View of Science*. Center for the Future of Public Education, 1991.

Kozol, Jonathan. *The Night is Dark and I am Far from Home*. New York: Simon & Schuster, 1990.

Lounsbury, John H., ed. *Connecting the Curriculum through Interdisciplinary Instruction*. Columbus, OH: National Middle School Association, 1992.

Margulies, Nancy. *Mapping Inner Space: Learning and Teaching Mind Mapping*. Tucson, AZ: Zephyr Press, 1991.

Martinello, Marian L., and Gillian E. Cook. *Interdisciplinary Inquiry in Teaching and Learning*. New York: Macmillan, 1994.

Marzano, Robert J. *A Different Kind of Classroom: Teaching With Dimensions of Learning*. Alexandria, VA: Association for Supervision and Curriculum Development, 1992

Maurer, Richard. *Designing Alternative Assessments for Interdisciplinary Curriculum in Middle and Secondary Schools*. Boston: Allyn & Bacon, 1996.

—. *Designing Interdisciplinary Curriculum in Middle, Junior High, and High Schools*. Boston: Allyn & Bacon, 1994.

Miller, John P., Bruce Cassie, Jr., and Susan M. Drake. *Holistic Learning: A Teacher's Guide to Integrated Studies*. Ontario Institute for Studies in Education, 1990

Nagel, Judith M. *Learning through Real-World Problem Solving: The Power of Integrative Teaching and Learning*. Thousand Oaks, CA: Corwin Press, 1996.

Newman, Judith M., ed. *Finding Our Own Way: Teachers Exploring Their Assumptions*. Portsmouth, NH: Heineman, 1990.

Raines, Shirley, ed. *Whole Language Across the Curriculum: Grades One, Two, and Three*. New York: Teachers College Press, 1995.

Resnick, Lauren B., and Leopold E. Klopfer. *Toward the Thinking Curriculum: Current Cognitive Research*. Alexandria, VA: Association for Supervision and Curriculum Development, 1989.

Seely, Amy E. *Professional's Guide: Integrated Thematic Units*. Westminster, CA: Teacher Created Materials, 1995.

Carnegie Council on Adolescent Development. Task Force on Education of Young Adolescents. *Turning Points: Preparing American Youth for the 21st Century*. New York: Carnegie Council On Adolescent Development, 1989.

Vars, Gordon F. *Synthesis of Research: A Briefing Paper Written for Connecting the Curriculum*. Madison,WI: Department of Public Instruction, 1995.

—. *Interdisciplinary Teaching: Why and How*. 2nd ed. National Middle School Association. 1993.

Wheelock, Anne. *Crossing the Tracks*. New York: The New Press, 1990.

Connecting the Curriculum

Video-Doing Action Research

Action research can help teachers improve teaching and learning through the study of their own classrooms and practices. This video program discusses the action research process and presents the experiences of several teachers who conducted their own action research studies. Teachers define a research question based on issues or problems of concern, develop a plan to study it, and then collect data as the action research unfolds. Research results can then be used to make changes in teaching practice. The specific examples in the video illustrate that action research is a professional development tool admirably suited for education.
1996, VHS, 30 min.

Video-Doing Curriculum Integration

One of the most powerful new tools teachers can use to improve teaching and learning is curriculum integration. This video provides an overview of the multidisciplinary and integrated approaches to curriculum integration. In this video, you'll see teachers working with one another, with students, and with parents to develop integrated curricula. Theory becomes practice as teachers work through real-life situations in the classroom. Finally, the video includes discussion by teachers explaining their experiences with connecting the curriculum.
1996, VHS, 30 min.

A Guide to Connected Curriculum and Action Research

A Guide to Connected Curriculum and Action Research joins two important and valuable movements in education. Connected curriculum is a powerful tool for teaching and learning because students learn more when they find connections in what they study. Through connected curricula, students see the connections in their learning, realize its value, and gain a more complete understanding of their world and how it works. A connected curriculum helps students better realize their full learning potential because it enables students to make connections in their lives—not only throughout their learning experiences at school, but also at home and in the community.

Action research, another component of this guide, helps teachers investigate their own teaching practices, with the ultimate goal of improving student learning. Educators around the world have found action research to be a powerful and practical means of improving their teaching skills and practices.

This guide provides the reader with guidance in creating connected curricula and conducting action research, including explanations of the processes that underlie them. But perhaps the most valuable aspect of this guide is that teachers explain in their own words what it is like to create curriculum connections and to investigate their practice through action research.
No. 7177, 1997, 125 pp.

Produced by James A. Beane, National-Louis University; Elizabeth A. Ellsworth, University of Wisconsin–Madison; and Janet L. Miller, National-Louis University.

The CTC Project was funded by the Federal Grant Program, The Secretary's Fund for Innovation in Education-Innovation in Education Program, U.S. Department of Education.

To order any of the Connecting the Curriculum products, call 1-800-243-8782.